CANADA
DEPARTMENT OF RESOURCES AND DEVELOPMENT

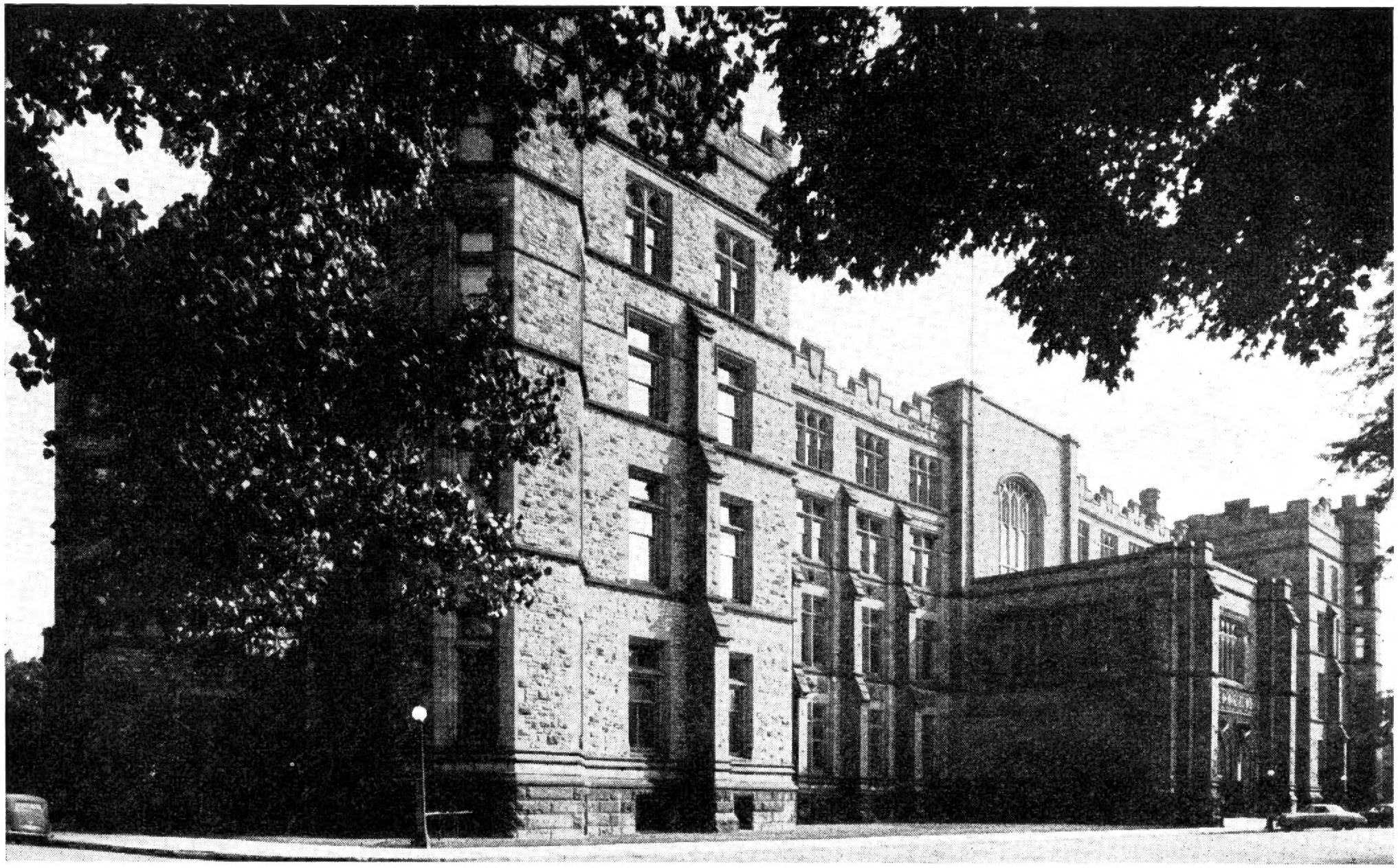
National Museum of Canada
Bulletin No. 128

ANNUAL REPORT OF THE NATIONAL MUSEUM OF CANADA

FOR THE FISCAL YEAR 1951-52

1953

Price, $1.50



The National Museum of Canada

CANADA
DEPARTMENT OF RESOURCES AND DEVELOPMENT

NATIONAL PARKS BRANCH

NATIONAL MUSEUM OF CANADA

ANNUAL REPORT OF THE
NATIONAL MUSEUM OF CANADA
FOR THE FISCAL YEAR 1951-52

BULLETIN No. 128

Issued under the authority of
THE MINISTER OF RESOURCES AND DEVELOPMENT
Ottawa
1953

Price, $1.50

64201—1½

CONTENTS

	Page
General activities of the National Museum of Canada, by F. J. Alcock	1
Archæological reconnaissance in the Mackenzie River drainage, by R. S. MacNeish	23
Excavation of a Cape Dorset Eskimo site, Mill Island, West Hudson Strait, by Deric O'Bryan	40
A preliminary report on the Sheguiandah site, Manitoulin Island, by Thomas E. Lee	58
An archæological examination of a historic site near Hawkesbury, Ont., by Thomas E. Lee	68
Sur le sens de l'évolution socio-culturelle de l'Ile Verte, par Marcel Rioux	81
Le carnaval-carême en Gaspésie, par Carmen Roy	94
Mots et choses d'Acadie, par Luc Lacourcière et Félix-Antoine Savard	98
Botanical investigations in the Glacial Lakes Agassiz–Souris Basins, 1951, by H. J. Scoggan	103
Botanical investigations in the Reindeer–Nueltin lakes area, Manitoba, by W. K. W. Baldwin	110
List of plants collected on Prince Charles and Air Force Islands in Foxe Basin, N.W.T., by W. K. W. Baldwin	143
Plants from two small island habitats in James Bay, by W. K. W. Baldwin	154
Mammals of the Trois Pistoles area and the Gaspé Peninsula, Quebec, by A. W. Cameron	168
Notes on birds of the area of intergradation between Eastern Prairie and Forest in Canada, by W. Earl Godfrey	189
Report on biological investigations at Alert, N.W.T., by S. D. MacDonald	241
The fishes collected by the Canadian Arctic Expedition 1913–18, with additional notes on the Ichthyofauna of Western Arctic Canada, by Vladimir Walters	257
A new hadrosaur from the Oldman formation of Alberta: discussion of nomenclature, by C. M. Sternberg	275

Illustrations

Plate I.	The National Museum of Canada	Frontispiece
II.	Artifacts from Site N.W.T. 54	35
III.	Artifacts from Sites N.W.T. 42, 47, 51, 53, 56, 62	37
IV.	Artifacts from Sites N.W.T. 5, 58, 59, 61	39
V.	A. Ruin before excavation (Mill Island)	47
	B. Ruin after rooms had been cleared (Mill Island)	47
VI.	A. North room, looking northwest (Mill Island)	48
	B. South room looking west along the entrance passage (Mill Island)	48
VII-XI.	Artifacts (Mill Island)	49–57
XII, XIII.	Quartzite artifacts from Sheguiandah Site, Manitoulin Island	65, 67
XIV.	A. Tree-top view of three dugouts used by early white trappers	79
	B. View showing part of a European bone china plate, also iron nail, in the ashes of a fireplace	79
XV.	A. A line of post-moulds, cross-sectioned, marking position of former palisade	80
	B. One of the European iron hatchet heads found on site	80
XVI.	A. Limestone strata at Steep Rock, Portage Bay, Lake Manitoba	108
	B. Valley of Assiniboine River south of St. Lazare	108
XVII.	A. Spruce Woods Forest Reserve, near Brandon	109
	B. Sandy blowout in prairie near St. Lazare	109

Plate — Page

XVIII. Hilltop view of stand of black spruce, Cochrane River 113
XIX. Open mixed forest of black spruce, birch, and jack pine, Cochrane River 114
XX. Mixed forest of black spruce and birch on flank of sandy esker beside Cochrane River 115
XXI. Pure jack pine forest regenerating after fire, beaches at Long Point, Reindeer Lake 116
XXII. Muskeg and marsh surrounding landlocked lake near Long Point, Reindeer Lake 117
XXIII. Muskeg around small inland lake near Cochrane River 118
XXIV. Flooded shoreline of Reindeer Lake at Sawbill showing *Cicuta mackenzieana* in flower 119
XXV. Richer and more varied vegetation beside rapids of Sawbill River ... 120
XXVI. Shoreline of black spruce forest drowned by dammed waters of Reindeer Lake at Sawbill 121
XXVII. Zonation on shore of Cochrane River 122
XXVIII. Granite hill on Cochrane River providing a rocky substrate and cliff faces 123
XXIX. Treeless morainic hills at south end of Nueltin Lake 124
XXX. View parallel to south coast of Prince Charles Island 143
XXXI. Pool with cotton grass surrounded by wet sedge and grass meadow (Prince Charles I.) 145
XXXII. Pool on disintegrated limestone at northern end of Prince Charles Island 146
XXXIII. Rocky hill above raised beach at northern end of Air Force Island .. 147
XXXIV. Shoreline of Gasket Shoal 157
XXXV. Willow on low gravel ridge in centre of Gasket Shoal 158
XXXVI. North coast of Solomon's Temple Island showing rocky terrain and strand lines of driftwood 161
XXXVII. Pool on rocky hillside of Solomon's Temple Island with dwarfed black spruce on far side 162
XXXVIII-XLI. Various views of *Brachylophosaurus canadensis*. Holotype No. 8893 N.M.C. 277, 278, 281, 282

Figure — Page

1. Route of survey shown on map of eastern part of N.W.T 24
2. Sketch map of Mill Island 40
3. Sketch map of Sheguiandah site, Manitoulin Island 60
4. The palisade position at the foot of the Long Sault Rapids 69
5. Canoes moving up-river forced to land by swift waters at foot of the Long Sault 70
6. Cross-sections of post hole moulds in the palisade 71
7. Palisade sections revealed by trenching 74
8. Sketch map of northwestern Manitoba 111
9. Sketch map of Foxe Basin showing Prince Charles and Air Force islands 144
10. Sketch map of James Bay showing position of Gasket Shoal and Solomon's Temple islands 156
11. Sketch map showing Trois Pistoles Area and Gaspé Peninsula 168
12. Map of Manitoba showing localities mentioned in text 190
13. Sketch of makeshift dredge used in collecting marine invertebrates 254
14. Three dentitional variants of *Salvelinus alpinus* (L.) 258

GENERAL ACTIVITIES OF THE NATIONAL MUSEUM OF CANADA

By F. J. Alcock, Chief Curator

During the fiscal year ended March 31, 1952, the National Museum of Canada added a large amount of new material for exhibit and study to its collections through gift and purchase and, to a much greater extent, through the field work carried out by its scientific staff. The field investigations also supplied a great deal of new information, particularly in the fields of anthropology, botany, zoology, and vertebrate palæontology. A number of important bulletins, special publications, and articles were issued, and other phases of the educational work were expanded, including the loan of material for exhibition both in Canada and abroad.

Field work in archæology was carried out on Cornwallis Island in the Arctic, in British Columbia, on the western margin of the Canadian Shield in the Northwest Territories, on the plains region of Saskatchewan and Manitoba, and in southern Ontario. Ethnological studies, including the collecting and recording of folklore and folk songs, were carried out in Newfoundland, Nova Scotia, Quebec, and the Yukon. Collecting of mammals, birds, and invertebrate forms was done in Newfoundland, Quebec, New Brunswick, and Ellesmere Island in the Arctic. An expedition to southern Saskatchewan collected fossil mammal remains from Tertiary strata. Botanical studies were made in Alberta and Manitoba. The Chief Curator visited the museums of Quebec and the Maritime Provinces, the Museum field parties at work in this region, the National Parks which have museums, and others where the establishment of local museums is under consideration.

The following are some of the more important accessions acquired during the year. Mr. H. R. MacMillan, of Vancouver, B.C., very generously donated slices of three large trees which grew on Vancouver Island. One of these slices is from a Douglas fir, 58 inches in diameter and 1,106 years old; the second is from a yellow cedar, 33 inches in diameter and 985 years old; and the third is from a red cedar, 80 inches in diameter and 759 years old. All three are now on exhibit. Two large mural paintings by Grace Coombs, illustrating the Indian legend, "The Sky Woman", were received and are also now on exhibit. An important manuscript volume of coloured drawings by Phillip Henry Gosse, 1833, entitled "Entomologia Terrae Novae", illustrating Newfoundland insects, was donated by Mr. Phillip Gosse of West Wratling, Cambridgeshire, England, grandson of the artist. Two large murals were painted by National Museum artists. One, a Mesozoic scene, is in the Hall of Vertebrate Palæontology, and the other, a West Coast fishing scene, is in the west Anthropological Hall. A diorama, illustrating the Christmas story as told to the Huron Indians by the early Jesuit Missionaries, the first Canadian carol, JESOUS AHATONIA—JESUS IS BORN, by Jean de Brébeuf, was completed and placed on display in the rotunda during the Christmas season. The policy of having a special "Exhibit of the Month" was continued.

Saturday morning lectures for children, a feature begun in 1912, and Wednesday evening lectures for adults, a feature begun in 1922, were again an important phase of the Museum's activities. The Museum's auditorium

was also used for lectures on many other occasions by scientific societies. During the months of July and August a film programme, entitled "Canada in Colour," was put on every afternoon, Monday to Friday, from 3 to 4 o'clock, for the benefit of tourists and visitors. The National Film Board co-operated in this service and also in the production of a film strip "Through the Totem Poles to the National Museum," showing the work of the Museum. Progress was made on three other strips showing particular phases of the Museum's work. The Macoun Field Club, composed of three groups of boys and girls, whose object is to foster an interest in natural history, had an active year. Its headquarters is at the National Museum, and its leaders are members of the Museum's staff and of the Ottawa Field-Naturalists' Club.

The following reports were published: "Totem Poles," Bulletin No. 119, Vol. II, pages 435 to 880, Totem Poles According to Location, by Marius Barbeau; "Botany of Southeastern Yukon Adjacent to the Canol Road," Bulletin No. 121, 400 pages, by A. E. Porsild; "The Hepaticæ of the East Coast of Hudson Bay," Bulletin No. 122, 62 pages, by R. M. Schuster; "Annual Report of the National Museum of Canada for the Fiscal Year 1949-50," Bulletin No. 123, 261 pages. A short report, "The Bats of Canada," by A. W. Cameron, was issued, as well as a series of six leaflets describing the following mammals on display in the larger habitat groups in the Mammal and Bird Hall: "The Bison," "The Muskox," "The Wolf," "The Polar Bear," "The Beaver," and "The Red Fox." In all, the members of the staff of the Museum published during the year 49 bulletins, papers, and reviews, and gave 32 public lectures.

Several changes took place in the personnel during the year. Mr. Clyde L. Patch, who had been on the staff since 1913, retired on August 31, 1951, on account of ill health, and died on February 11, 1952. He had been the Museum's authority on herpetology, the branch of biology that deals with amphibians and reptiles, and was also responsible for many of the Museum's biological exhibits, particularly the large habitat groups. The Museum also lost, through superannuation, the services of Claude Edward Johnson, artist-naturalist, who had given continuous service since May, 1914. Mr. Johnson's position has been filled by Mr. John Crosby. Another addition has been Mr. G. E. Lindblad, who began his duties on May 1 as a technical officer in charge of the laboratory of Vertebrate Palæontology.

The attendance at all Museum activities during the year by adult and junior groups, including visitors to the exhibition halls, was 218,259.

Educational Work

The educational services of the Museum provide a wide programme of special lectures, temporary exhibits, exhibition hall tours, loans of visual aids, including natural history and anthropological specimens; loan exhibitions, publications, and correspondence by which information concerning the natural history of Canada is supplied to both adults and children. The success of this programme is made possible by the co-operation and assistance of the scientific, art, and maintenance staffs. In addition, information and study material is made available to scientists and advanced students in the natural sciences.

A special exhibit illustrating the educational facilities of the National Museum was sent for display at the Teachers' Summer School at the University of Saskatchewan. Other material was lent for the Audio-Visual Education Course at Toronto.

A talk on "How to Make Better Use of the National Museum" was given by Miss Mabel W. Godwin to a Home and School Group.

Miss Godwin and Miss V. M. Humphreys attended the Northeast Conference of the American Association of Museums held at Cooperstown, N.Y., during October. A special feature of the meeting was a round table discussion on the "School Group and the Museum."

Macoun Field Club

The Macoun Field Club continued its activities under the joint sponsorship of the National Museum and the Ottawa Field-Naturalists' Club. Its meetings held on Saturday mornings during the autumn, winter, and spring, were arranged to permit members to attend the Museum's junior lecture series. Field trips, workroom projects, and talks on natural history and conservation made the year a profitable one for Club members.

National Museum Lectures

An important part of the Museum's adult education programme was the annual series of evening lectures and motion pictures arranged to meet a wide variety of interests. The Lecture Committee, in charge of arrangements, consisting of F. J. Alcock, Chairman; W. K. W. Baldwin, W. E. Godfrey, M. F. Goudge, J. F. Henderson, M. Rioux, H. J. Scoggan, and Miss M. Godwin, Secretary, reports a most successful season.

Adult Lectures

Your Other Eye is More than a Spare, by Professor K. B. Jackson, B.A.Sc., University of Toronto, Toronto, Ont.

Men of Two Worlds—A Motion Picture.

Some Impressions From a Sister Dominion, by The Honourable T. C. A. Hislop, C.M.G., High Commissioner for New Zealand, Ottawa.

The American Bald Eagle, by Charles L. Broley, Delta, Ont.

From Watershed to Watermark, by J. M. Humphrey, Vancouver, B.C.

What Next in China? by George Babcock Cressey, M.E.S., D.H.L., Ph.D. Department of Geography, Syracuse University, Syracuse, N.Y., U.S.A.

The Royal Family—A Motion Picture Programme.

Northwest Totems are Modern, by Marius Barbeau, Ottawa.

Spitsbergen, An Arctic Wonderland, by Professor George W. Tyrrell, University of Glasgow, Glasgow, Scotland.

Solving the Riddle of Chubb Crater, by V. B. Meen, M.A., Ph.D., Director, Royal Ontario Museum of Geology and Mineralogy, Toronto, Ont.

Across Canada in Colour, by Nicholas Morant, Canadian Pacific Railway Company, Montreal, Que.

A Doctor in the Labrador, by H. T. R. Mount, M.B., M.S., F.A.C.S., Ottawa.

Motion Picture Programme—shown through the courtesy of the United States Embassy, Ottawa.

Yesterday's 7,000 Years, by William A. Ritchie, M.S., Ph.D., State Archæologist, The University of the State of New York, Albany, N.Y., U.S.A.

Newfoundland, by The Honourable F. Gordon Bradley, Q.C., Secretary of State, Ottawa.
Motion Picture Programme—shown through the courtesy of the National Film Board, Ottawa.
From Prairie to Arctic Tundra, by H. J. Scoggan, M.Sc., Ph.D., National Museum of Canada, Ottawa.
Creating Canadian Designs, by Thor C. Hansen, Art Director, British American Oil Company, Limited, Toronto, Ont.
Our National Capital, by Walter Bowker, National Capital Planning Commission, Federal District Commission, Ottawa.

A series of junior lectures and motion picture programmes was presented on Saturday mornings, as in past years, with an average attendance of 1,000 school children. On account of the wide age range of the young audiences of from 7 to 12 years, occasional children's feature films were shown. It was found that notices sent weekly to schools in Ottawa and vicinity kept the series more flexible than has the comprehensive programme mailed at the beginning of the series.

Children's Lectures

Motion Picture Programme—*The Mysterious Poacher.*
On Safari in Africa, by C. S. Lord, Ph.D., Geological Survey, Ottawa.
Eskimos, by Douglas Leechman, Ph.D., National Museum, Ottawa.
The Royal Canadian Mounted Police, by Sergeant J. E. Legault, Ottawa.
Motion Picture Programme—*The Royal Family.*
Motion Picture Programme—*Riders of the New Forest.*
How Animals Spend the Winter, by Austin W. Cameron, M.S., National Museum, Ottawa.
In a Fishing Schooner Off the Labrador Coast, by A. M. Christie, Ph.D., Geological Survey, Ottawa.
Totem Stories, by Marius Barbeau, Ottawa.
Dinosaur Hunters, by Charles M. Sternberg, Ottawa.
Frontier Forts, by C. G. Childe, National Parks and Historic Sites, Ottawa.
Motion Picture Programme—*The Boy Who Stopped Niagara.*
Space Travel, by P. M. Millman, Ph.D., Dominion Observatory, Ottawa.
Exploring Northern Manitoba, by H. J. Scoggan, Ph.D., National Museum, Ottawa.
Let's Go Exploring, by the Macoun Field Club, Ottawa.

A National Museum News Sheet was prepared for distribution to the Wednesday evening audiences.

Group Visits

School groups in increasing numbers came to the Museum with their teachers for guidance and instruction to supplement their school studies. These organized groups comprised a large proportion of visitors to the exhibition halls. The groups that came for regular study enjoyed the unique experience of classroom work outside the school. Although most of them were from Ottawa and surrounding districts, classes came also from Montreal, North Bay, Toronto, Lachute, Peterborough, and other localities; several school groups came from the United Kingdom and the United States. A party selected from the United Nations Korean Forces, representing nineteen countries was given a guided tour of the exhibition halls.

Lecture Hall

As formerly, scientific and related organizations were granted the use of the lecture hall, and the public was thus given the opportunity of hearing significant lectures on a variety of subjects. Among the organizations which were granted the use of the Hall were the Canadian Geographical Society, Royal Astronomical Society, Ottawa Field-Naturalists' Club, Scientific Film Society, United Nations Association, Canadian Institute of Mining and Metallurgy, Logan Geological Club, Ottawa Aeronautical Society, and the National Gallery.

Photographs

Photographs on anthropological, biological, and palæontological subjects from the Museum collections were in great demand as illustrations for scientific publications, text-books, magazine and newspaper articles, for exhibitions of wildlife photography, and for study purposes. Requests for this material were received from European countries, South America, the United Kingdom, and the United States, as well as from many parts of Canada. Special exhibits of photographs were prepared and sent to the National Museum of Wales; Florida State University Museum; Bromma School, Sweden; and the National Museum of Brazil.

Visual Aids

Museum loan material on anthropology, biology, palæontology, and other phases of natural history went to teachers, students, and other persons in each of the provinces, as well as in the Northwest Territories. This material is lent free of charge to museums and educational institutions in Canada, except for payment of transportation charges one way.

Publications

Besides the many requests from all parts of the world for scientific publications, there was a large demand from educational institutions and students for publications of a less technical nature.

ARCHÆOLOGY

Field Work

Douglas Leechman was engaged in field work from May to September. He visited local sites and collectors in the vicinity of Winnipeg, Regina, and Moose Jaw, and studied the collection made by Mr. H. Jones, which contains Folsomoid and Yuma-like points. At Medicine Hat he visited the local historical society at their request and suggested methods for the installation of their new museum and the cataloguing and exhibition of specimens. He went to Lethbridge with a committee of this society to value a collection of Prairie Indian specimens which had been offered for sale. In Calgary, he examined a series of recently discovered pictographs in rocky coulées and made photographic records of them in colour. In Vancouver he visited kitchen-midden sites, recently

excavated by Dr. Carl Borden of the University of British Columbia, and then proceeded to the southern interior of British Columbia and made a reconnaissance survey of the Hope to Princeton district and up the Okanagan Valley to Shuswap Lake. In this area he found many semi-subterranean house sites which had not previously been recorded, and the same is true of the Kamloops area. At this point an extensive prehistoric village site was investigated, and the skull of a prehistoric dog collected. He then went north to Williams Lake and west to the Chilcotin country which had not been explored in the archæological sense before. At Seton Lake, Lillooet, and Lytton, he examined archæological sites and semi-subterranean houses which showed a strong coastal influence. This influence appears to be much less prevalent in the Chilcotin. In the vicinity of Chase, he examined a number of prehistoric sites and collected numerous specimens.

On October 12th he attended the Conference of the Canadian Museums Association and reported on legislation for the protection of archæological sites. From October 18th to 20th he attended the Northeast Museums Conference at Cooperstown, N.Y., at which he read a paper and was elected Vice-President of the Conference. On November 16th and 17th he attended sessions of the American Anthropological Association in Chicago and showed a film recently completed for the Museum, "Making Primitive Stone Tools."

Richard S. MacNeish proceeded first to the Larter site, near Winnipeg, which he excavated, and then to the Lockport site, where extensive collections were also made. During July and August he carried out an archæological reconnaissance of the lower Mackenzie River district. He discovered fourteen new sites, one of which may be of great importance in connection with the study of Early Man in the Canadian Northwest. At this site, on Great Bear Lake, projectile points of an early type were found in association with fossil bones and a piece of mammoth tusk. In September he returned to the Winnipeg area and investigated a number of archæological sites to the north, one of which proved to be of the historic Cree and affords a datum point for the establishment of a chronological sequence.

In May he attended a meeting of the Central Section of the American Anthropological Association at Evanston, Illinois, and in December went to Philadelphia to attend a meeting of the American Association for the Advancement of Science at which the archæology of the interior Arctic was discussed. In March, 1952, he attended a meeting on Northeastern Archæology, at Albany, N.Y., where he read a paper.

Thomas E. Lee made a short field trip to Casselman, Ont., early in April and later in that month worked east of Hawkesbury, Ont., in an effort to discover some trace of Dollard's 1660 battleground. He investigated one site, which proved to be a white man's building, possibly a trading-post. From the end of April to early November he carried out an archæological survey in parts of Haldimand, Norfolk, Elgin, Essex, Lambton, Bruce, Grey, and Simcoe counties, Parry Sound, the Sudbury district,

and on Manitoulin Island. Considerable excavation was done in addition to surface collecting. Eighty sites were discovered and approximately 12,000 artifacts were acquired. From November 14th to 26th, the work at Hawkesbury was continued with gratifying results, and an entire palisade was discovered just at the foot of the Long Sault rapids on the Ottawa. Early in February he visited the University of Western Ontario and the Royal Ontario Museum of Archæology and discussed current archæological problems with the staff of these two museums.

Dr. Catharine McClellan continued her investigations in the southern Yukon from mid-September, 1950, until late May, 1951, and in July and August of 1951. She spent four months in the field at Carcross and then moved to Teslin, where she stayed until the middle of May. At each place she lived alone in a cabin on the edge of the native village; thus it was possible to have Indian visitors at any time, and never did she lack for informants. During the winter she stayed for a short time with an elderly Indian couple at Little Atlin Lake, about thirty miles east of Carcross, and was able to study their leisurely winter life in the remote bush country. In early spring she went on a week's trapping expedition with one of the Teslin Indians on the west side of Teslin Lake and was able to study hunting and trapping techniques at first-hand. During the summer she again visited Carcross, Teslin, and Atlin, and made further studies and collected more material, which is now being prepared for publication.

Boyd Wettlaufer spent three months in an archæological survey of the southern part of the province of Saskatchewan. He investigated all the archæological sites he could reach in 5,400 miles of travel by car, including middens, camp refuse deposits, bison kills, temporary camp-sites, and the chronologically much earlier sites presumably occupied by Early Man. He compiled a list, known to be incomplete, of over three hundred amateur collectors, and recommended a number of sites for more thorough investigation at a future time.

W. E. Taylor was engaged in archæological work at Resolute Bay, Cornwallis Island, N.W.T., from August 18th to 30th. The work was carried out under instructions from Dr. H. B. Collins, Jr., of the Smithsonian Institution, and was a continuation of work done at this point by Dr. Collins for the National Museum in 1949 and 1950. Six ruined stone houses were excavated and a large part of a midden near them. Nearly all of the material collected belongs to the Thule culture, but in the northern part of the midden, definite stratification was found. The upper stratum, about six inches thick, contained Thule material, and the lower stratum, about a foot thick, contained a scattering of Dorset artifacts but no Thule material. The Dorset layer contained numerous tiny chips of flint, debris from the making of chipped stone implements, but these were not present in the upper layer; the Thule people used ground slate implements rather than chipped stone. Human remains were collected from two graves nearby, but there was no way of determining whether they were Dorset or Thule. The coastline was examined for about twenty miles to the east

in the hope of finding other winter villages, but without success. A Geological Survey party reported two house ruins 40 miles west, and two more 60 miles west, of Resolute Bay.

Office Work

In the office, Douglas Leechman studied the material collected in the field and compared it with material from other sites. He completed and arranged his notes on Yukon archæology preparatory to publication. He prepared and submitted a paper on the Vanta Kutchin and another on the folklore of these same people. In addition, he carried out many routine duties of an editorial and advisory nature.

R. S. MacNeish wrote a report on the Brohm site near Port Arthur which is one of the earliest yet recorded in Ontario and is characterized by Plainview points. On his return to the Museum after the summer's field work, he washed and catalogued the material collected during the summer, and studied the Manitoba specimens, which were found to represent four distant cultures. Research work in the Public Archives enabled him to identify the last of these as historic Cree.

T. E. Lee continued the cataloguing of the material that he collected in the field and other accessions to the archæological collection. He selected material for a display of Indian artifacts from Ontario, reconstructed pottery vessels from Ontario, and submitted reports on the following topics: "The Archæology of Essex County"; "A Preliminary Report on an Archæological Survey of Southwestern Ontario, 1950"; "Examination of the Ross Earthwork near Hawkesbury, Ont."; "An Archæological Examination of a Historic Site near Hawkesbury, Ont."; "A Preliminary Report on an Early Indian Site, Manitoulin Island"; "The Giant Site, Manitoulin Island"; "An Archæological Survey of Southwestern Ontario and Manitoulin, 1951"; and "The Discovery of the Battleground of the Heroes of the Long Sault."

Publications

Colour Photography in Science, by Douglas Leechman. Journal of Colour Photography, May, 1951.

Mercy in the North Country, by Douglas Leechman. Toronto Saturday Night, November 24, 1951.

An Implement of Elephant Bone from Manitoba, by Douglas Leechman. American Antiquity, October, 1950.

An Archæological Reconnaissance in the Northwest Territories, by Richard S. MacNeish. Annual Report, National Museum of Canada, 1949-50.

Kincaid, a Prehistoric Illinois Metropolis, by Richard S. MacNeish (contributing author). University of Chicago Press, Chicago, Ill. 385 pages.

A Preliminary Report on an Archæological Survey of Southwestern Ontario in 1950, by Thomas E. Lee. Annual Report, National Museum of Canada, 1949-50, Bulletin No. 123.

A Preliminary Report on an Archæological Survey of Southwestern Ontario, 1951, by Thomas E. Lee. Annual Report, National Museum of Canada, 1950-51. Bulletin No. 126.

Lectures

West Coast Indian Art, by Douglas Leechman. Montreal Museum of Fine Arts, April 5, 1951.

The Yukon and the Alaska Highway, by Douglas Leechman. The Canadian Club, Perth, April 27, 1951.

Canada's Northwest, by Douglas Leechman. Dominion United Church Men's Club, Ottawa, May 4, 1951.

Making Documentary Films, by Douglas Leechman. National Film Board Showing, Winnipeg, May 25, 1951.

Indian Days in the Yukon, by Douglas Leechman. Calgary Public Library, September 4, 1951.

The Yukon and the Klondike, by Douglas Leechman. Women's Canadian Club, St. Thomas, Ont., September 25, 1951.

Indian Arts and Crafts, by Douglas Leechman. Arnhem Chapter I.O.D.E., Ottawa, October 1, 1951.

Anthropology in the Yukon, by Douglas Leechman. American Ornithologists' Union, Montreal, October 11, 1951.

Indian Lore and Mythology, by Douglas Leechman. Northeast Museums Conference, Cooperstown, N.Y., October 19, 1951.

All about Eskimos, by Douglas Leechman. National Museum Children's Lecture Series, Ottawa, October 27, 1951.

Indian Days in the Ottawa Valley, by Douglas Leechman. Women's University Club, Ottawa, November 13, 1951.

Making Primitive Stone Tools, by Douglas Leechman. American Anthropological Association, Chicago, November 16, 1951.

Man's Journey from Asia to America, by Douglas Leechman. National Research Council Scientists' Wives Association, Ottawa, December 12, 1951.

Migrations through Alaska, by Douglas Leechman. Women's Canadian Club, Hudson, Que. March 18, 1952.

Down North, by Douglas Leechman. The Canadian Club, Perth, Ont., March 22, 1952.

A Possible Early Site near Port Arthur, Ont., by Richard S. MacNeish, American Anthropological Association, Evanston, Ill., May 5, 1951.

The Archæology of Essex County, by Thomas E. Lee. Radio broadcast, CKLW, Windsor, Ont., June 2, 1951.

Archaeological Developments in Ontario, by Thomas E. Lee. University of Western Ontario Summer School, July 11, 1951.

The Battle of the Long Sault, by Thomas E. Lee. Chalmers United Church, Ottawa, March 9, 1952.

The Discovery of Dollard's 1660 Battle Ground, by Thomas E. Lee. Discussion Club, YMCA, Ottawa, March 14, 1952.

Accessions

Dr. J. E. Armstrong: stone celts from New Westminster, B.C.
Robert Barlow: stone celt from British Columbia.
Henri Baron: an Assomption sash from Quebec.
Douglas Bell: Eskimo archæological material from Southampton Island.
E. J. Biederman: pottery rim sherd from Wales, Ont.
George Bromley: points and blades from Wentworth County, Ont.
C. H. Brown: drum and two drumsticks from the Swampy Cree.
Austin Cameron: two celts from Australia and New Zealand.
J. N. Emerson: archæological collection from Mud Lake, Ont.
N. Gilbert: an Assomption sash from Quebec.
Mrs. Nora Hare: chipped stone blade from Minto Lake, Y.T.
Miss Glen Hood: trade beads from Simcoe County, Ont.

Thomas E. Lee: archæological collections from Ontario.
Douglas Leechman: archæological collections from British Columbia and the prairies.
Miss Norma McCallum: projectile points from Malahide Township, Ont.
Richard S. MacNeish: archæological collections from Manitoba and the Northwest Territories.
Constable D. M. Nelson: Eskimo specimens from Dundas Harbour.
Mrs. Robert Neil: beadwork from Ontario.
W. J. Parker: notched point from Elgin County, Ont.
Donald Shutt: archæological collections from Bruce County, Ont.
H. F. Smith: mortar stone from Woodridge, Ont.
Mrs. E. S. Taylor: archæological collection from Saskatchewan.
Alex. Tennant: bone flesher from Leedale, Alta.
A. E. Tyson: stone pestle from Burnt Creek, Labrador.
Robert Watson: projectile point from Dorchester, Ont.
Mrs. Westlake: archæological collections from Bruce Peninsula, Ont.
Gordon White: sandstone abrader from Elgin County, Ont.
Mrs. Helen Youell: celt, points, and blades from Aylmer, Ont.

ETHNOLOGY

Field Work

Marcel Rioux continued his study of the secularization processes and social changes of French Canada. As part of that project, a survey was made in a village which presented some of the typical characteristics of the phase, the investigation of which was planned for that year. The village of Ste-Brigitte de Laval in Montmorency county was under study from May to September. Sociocultural data were gathered with special emphasis on the dynamic processes accounting for the evolution of the mores and the social structure. The parochial archives were analyzed for a period of one hundred years. Life histories were obtained and Rorschach tests were administered to a sociological group of the population. A few folk songs were also collected.

Miss Helen Creighton spent the field season in Halifax County, N.S., paying particular attention to the area west of Halifax. It is a region where there has been a mixing of French and German blood with the Anglo-Saxon. Of 214 songs recorded, 34 are indigenous, 12 Gaelic, 9 French, and the remainder English and Irish. Items of folk-lore, apart from songs, were collected and typed on separate index cards, numbering in all 479. The items include superstitions, ghost stores, treasures, witch-craft, old remedies, old sayings, legends, and the personal history of all the more important informants. In August, Miss Creighton represented the National Museum at the tercentenary celebrations at the Acadian settlement at Pubnico.

Miss Carmen Roy worked again in 1951 in Gaspé Peninsula. Her work was along the same lines as in the previous years, and the materials she collected are of about the same general type as those of Miss Creighton. The survey is progressing, and monographs on various subjects should shortly be ready for publication.

Kenneth H. Peacock worked in Newfoundland continuing the survey on folk music that Miss M. Sargent had begun two years previously. Extensive collections were obtained and recorded on a tape-recording machine.

Office Work

In the office, Marcel Rioux worked on his field material; this was analyzed, classified, and compared with data previously gathered, in order to arrive at conclusions on the secularization processes in French Canada. A tentative statement is given in an article published in this bulletin.

Assistance was given to the Wenner-Gren Foundation for Anthropological Research in the preparation of a *Handbook of World Resources for Research and Education in Anthropology*. An album of disks on the Folk Music of Canada was prepared for the Ethic Folk Ways of New York. Several articles were prepared for scientific journals, among which is mentioned a study on the concept of social typology to be published by La Revue de Psychologie des Peuples, of France. The materials of field workers, who do not report to Ottawa, were catalogued and examined in the office.

Mr. Kenneth Peacock transcribed his Newfoundland collection of folk songs.

Publications

Some Medical Beliefs and Practices of the Contemporary Iroquois Longhouses of the Six Nations Reserve, by Marcel Rioux. The Journal of the Washington Academy of Sciences, vol. 41, No. 5, May 15, 1951. Pp. 152-158.

Le Concept d'Ethos: Voie d'Accès á la Psychologie des Peuples et des Civilisations, by Marcel Rioux. La Revue de Psychologie des Peuples, 2nd trimester, 1951. P. 8.

Les Sociétés Paysannes: Méthodes d'Etudes, by Marcel Rioux. La Revue d'Histoire de l'Amérique Française, vol. 2, No. 4, 1952. P. 14.

Anthropology, by Marcel Rioux and June MacNeish. Indian School Bulletin, vol. 6, No. 4, March, 1952.

ZOOLOGY

Field Work

A field study of the birds of certain areas of Manitoba was carried out by W. Earl Godfrey, assisted by C. L. Thacker. Southeastern Manitoba is an important area of subspecific intergradation but has received little ornithological attention in the past. For this reason, one and a half months were spent in this part of the province. Camp was established at Whitemouth from June 1st to July 13th. From here an area was covered east to the Ontario boundary, northeast to Big Whiteshell Lake, north to Pine Falls and Winnipeg Beach, west to Hazelbridge, and south to Sandilands Forest Reserve. The Sprague-Middleboro area was worked July 15th and 16th. To supplement the work of previous Museum expeditions on the birds of northeastern and central Manitoba, the period July 20th to August 4th was spent in the Dawson Bay area at the north of Lake Winnipegosis. As a result of all this field work, 406 bird

specimens, with full data, were collected and prepared. Information on the distribution, numerical status, and habitat preference of the birds in the areas studied was secured. Numerous photographs and several hundred feet of motion pictures were taken.

The mammals of eastern Quebec, Gaspé, and eastern Newfoundland were investigated by Austin W. Cameron, assisted by Marshall Ronalds. The period from May 21st to June 12th was spent in the Trois Pistoles area of eastern Quebec, in co-operation with the Provancher Natural History Society of Quebec. The grey seal colony of the islands was studied, as well as the terrestrial mammals of the area. Subsequently, until August 1st, Cameron investigated the mammals of eastern Gaspé, in particular the vicinities of Dartmouth River and Grande Grève. Here again, the grey seal was studied, and a fine series of the smaller terrestrial mammals was collected. The period from August 1st to September 2nd was spent in Newfoundland. During the greater part of this time, work was concentrated at the whaling station at South Dildo, where numerous photographs and observations of whales and porpoises were made.

The fauna of the Miramichi River estuary was studied by E. L. Bousfield, May 26th to September 8th. The marine plankton, bottom-living organisms, and the intertidal forms were investigated. A large collection was made, accompanied by full hydrographical and meteorological data. On the return from the Miramichi area, a preliminary study was made of the intertidal organisms of the Bay of Chaleur, the Gaspé coast, and the south shore of the St. Lawrence River.

A biological survey of the vicinity of Alert, Ellesmere Island, the northernmost establishment in Canada, was carried out by S. D. MacDonald, April 14th to September 30th. Primary attention was given to the birds and mammals, a representative collection of which was obtained, but a series of marine fishes and invertebrates, as well as a collection of land plants, was also brought back. This survey was made possible through the co-operation of the Meteorological Service, Department of Transport, and the United States Weather Bureau.

Field work in vertebrate palæontology was under the direction of L. S. Russell, assisted by H. L. Shearman and M. Herniak. Approximately two months were spent in the southeastern part of the Cypress Hills of Saskatchewan, exploring the Oligocene deposits for fossil mammals. Although specimens were obtained from a number of localities, the most productive was the Fenley Hunter site on Calf Creek. Here, in spite of the slow and difficult digging, a good series of titanothere skulls, jaws, and miscellaneous bones was obtained. Much rich ground remains to be explored here. On return from the field, Russell was able to examine briefly the equivalent deposits of South Dakota and Nebraska.

Office Work

Early in the year, Russell completed two papers for the Annual Report for 1950-51, one on the fossil molluscs of the Kishenehn formation of British Columbia and one on the Cretaceous mammals of Alberta. Studies

on the Tertiary mammals of Saskatchewan continued throughout the year; those on the Eocene and Miocene faunas being virtually completed, but that on the much richer Oligocene fauna being likely to continue for some time. Fossil fishes from the Devonian of Gaspé and the Triassic of the Rocky Mountains are also under investigation. Specimens of fossil vertebrates and of fossil and recent molluscs were identified for the Geological Survey and for various individuals. Curatorial work was done on the collections of fossil vertebrates and recent molluscs.

W. Earl Godfrey was responsible for all ornithological work of the Museum. He completed his report on the birds of Lesser Slave Lake–Peace River areas of Alberta for the Annual Report of the Museum for 1950-51. Later he finished a study of the races of the Olive-backed Thrush and a report on the central Canada birds. Other studies made during the year included an investigation of the Horned Larks of the Prairie Provinces and of the western subspecies of the Boreal Chickadee.

Austin W. Cameron completed papers on the bats of Canada, the control of small mammal pests in eastern Canada, and the Long-tailed Weasel near Quebec City. Almost completed during the year was a general report on the mammals of eastern Quebec and more detailed accounts of the mammals of the Trois Pistoles area and the Gaspé peninsula. Also in progress was a study of the Red-backed Mice of Eastern Canada. Reviews of articles on mammals were prepared for publication. Numerous inquiries on mammals were answered, and specimens of mammals were identified for various institutions and people.

E. L. Bousfield continued his studies on the barnacles of the Bay of Fundy and the Grand Banks of Newfoundland. The collections of the 1950 and 1951 field seasons were sorted and identified. Intertidal organisms collected from the Gaspé coast were studied. Collections of crustaceans or molluscs were examined and reported on for the Fisheries Research Board of Canada, the Entomological Branch of the Department of Agriculture, the Geographical Branch and the Geological Survey of the Department of Mines and Technical Surveys, the Canadian Wildlife Service, Dr. A. C. Huntsman of Toronto, Commander D. C. Nutt of Dartmouth College, and for Miss Dorothy Brown of the William F. Clapp Laboratories Inc., Duxbury, Massachusetts.

John A. Crosby performed the duties of zoological artist. He prepared miniature dioramas of the Mountain Goat and Mountain Sheep, and made numerous paintings of birds and mammals for use as illustrations by the National Museum and the Canadian Wildlife Service. He prepared maps and diagrams for use as illustrations, and assisted in the rearrangement of the exhibition series of mammals.

G. E. Lindblad gave detailed supervision to the work of the laboratory of vertebrate palæontology. A number of fossil dinosaurs and mammals were prepared by him or under his direction. This work was impeded by much needed renovation of the laboratory quarters.

S. D. MacDonald completed his report on the zoological survey of the Alert area, Ellesmere Island. He prepared bird and mammal skins for the study collection and mounted birds and mammals for the exhibition series.

Publications

Acanthodians of the Upper Devonian Escuminac Formation, Maguasha, Que., by Loris S. Russell. Annals and Magazine of Natural History, ser. 12, vol. 4, pp. 401-407, 3 figs., 1951.

Bobasatrania? canadensis (Lambe), a Giant Chondrostean Fish from the Rocky Mountains, by Loris S. Russell. Annual Report of the National Museum for the Fiscal Year 1949-50, National Museum of Canada, Bulletin No. 123, 1951, pp. 218-224, 2 pls.

Age of the Front-Range Deformation in the North American Cordillera, by Loris S. Russell. Transactions of the Royal Society of Canada, ser. 3, vol. 45, sec. 4, 1951. pp. 47-69, 9 figs.

Land Snails of the Cypress Hills and their Significance, by Loris S. Russell. Canadian Field-Naturalist, 1951, vol. 65, no. 5, pp. 174-175.

Annual Meeting of the Canadian Museums Association, October, 1951, by Loris S. Russell. Bulletin of the Canadian Museums Association, 1952, vol. 5, no. 1, pp. 2-7.

The Northeast Conference of the American Association of Museums, Cooperstown, N.Y., 19th and 20th October, 1951. By Loris S. Russell. Bulletin of the Canadian Museums Association, 1952, vol. 5, no. 1, pp. 7-12.

Succession Duties and Museum Bequests, by Loris S. Russell. Bulletin of the Canadian Museums Association, 1952, vol. 5, No. 1, pp. 13-15.

Television and Museums—An Interim Report, by Loris S. Russell. Bulletin of the Canadian Museums Association, 1952, vol. 5, No. 1, pp. 15-16.

Two Reviews of Current Literature, by Loris S. Russell. Canadian Field-Naturalist, 1951, vol. 5, no. 3, p. 123; no. 5, p. 189.

Complete Skeleton of Leptoceratops gracilis Brown from the Upper Edmonton Member on Red Deer River, Alta., by C. M. Sternberg. Annual Report of the National Museum for the Fiscal Year 1949-50, National Museum of Canada, Bulletin 123, 1951, pp. 225-255.

The Lizard Chamops from the Wapiti Formation of Northern Alberta: Polyodontosaurus Grandis not a Lizard, by C. M. Sternberg. Annual Report of the National Museum for the Fiscal Year 1949-50, National Museum of Canada, Bulletin 123, 1951, pp. 256-258.

White Whale and Other Pleistocene Fossils from the Ottawa Valley, by C. M. Sternberg. Annual Report of the National Museum for the Fiscal Year 1949-50, National Museum of Canada, Bulletin 123, 1951, pp. 259-261.

Geographical Variations in the Boreal Chickadee East of the Rockies, by W. Earl Godfrey. Canadian Field-Naturalist, 1951, vol. 65, No. 1, pp. 22-26.

The Nevada Cowbird at James Bay, Ont., by W. Earl Godfrey. Canadian Field-Naturalist, 1951, vol. 65, No. 1, p. 46.

Notes on the Birds of Southern Yukon Territory, by W. Earl Godfrey. Annual Report of the National Museum for the Fiscal Year 1949-50, National Museum of Canada. Bulletin 123, 1951, pp. 88-115, 5 figs.

Comments on the Races of the Myrtle Warbler, by W. Earl Godfrey. Canadian Field-Naturalist, 1951, vol. 65, No. 5, pp. 166-167.

A New Northwestern Olive-backed Thrush, by W. Earl Godfrey. Canadian Field-Naturalist, 1951, vol. 65, No. 5, pp. 172-174.

Eleven Reviews of Current Literature, by W. Earl Godfrey. Canadian Field-Naturalist, 1951, vol. 5, No. 2, pp. 84-86; No. 3, p. 124; No. 5, pp. 188-190.

Two Reviews of Current Literature, by W. Earl Godfrey. Bird-Banding, 1951, vol. 22, p. 189; 1952, vol. 23, pp. 46-47.

Greenland Right Whale Recorded in Gaspé County, Que., by Austin W. Cameron. Annual Report of the National Museum for the Fiscal Year 1949-50, National Museum of Canada, Bulletin 123, 1951, pp. 116-119, 3 figs.

The Mammals of the Lake Mistassini and Lake Albanel Regions, Que., by Austin W. Cameron and William A. Morris. Annual Report of the National Museum for the Fiscal Year 1949-50, National Museum of Canada, Bulletin 123, pp. 120-130.

The Bats of Canada, by Austin W. Cameron. National Museum of Canada, 1951, 13 pp.

Two Reviews of Current Literature, by Austin W. Cameron. Canadian Field-Naturalist, 1951, vol. 65, No. 3, pp. 125-126.

One Review of Current Literature, by E. L. Bousfield. Canadian Field-Naturalist, 1951, vol. 5, No. 3, p. 122.

Lectures

Age of the Front-Range Deformation in the North American Cordillera, by Loris S. Russell. Royal Society of Canada, Sec. 4, Montreal, June 4.

Age of the Laramide Revolution, by Loris S. Russell. Department of Geology, Princeton University, November 19.

Age of the Rocky Mountain Deformation, by Loris S. Russell. Department of Geology, Queen's University, November 22.

A New Approach to the Problem of Extinction, by Loris S. Russell. Combined meeting of the Miller Club and the Biology Club, Queen's University, November 22.

Newfoundland Wildlife, by Austin W. Cameron. Newfoundland Natural History Society, St. John's, Nfld., August 27.

Animals in Winter, by Austin W. Cameron. National Museum Children's Lecture Series, February 2.

Accessions

By Gift: ***Mammals***

Ashwell, Charles O., South Dildo, Nfld.: skull of blackfish porpoise.

Bourguignon, A. E., Ottawa, Ont.: mole.

Brooks, Allan, Cardston, B.C.: 2 mammals (skins and skulls).

Campbell, Mitchell, Ottawa, Ont.: woodchuck, mole, shrew, 4 red fox skins, from Lower Moisie River, Que.

Dery, Dr. D. A., Quebec City: harbour seal skull in flesh, whale vertebra, snowshoe hare.

Guiou, Dr. Norman, Ottawa, Ont.: flying squirrel.

Hamm, Bernard, Canadian Wildlife Service, Wembley, Alta.: 2 ground squirrels.

Johnson, Gifford, Ottawa, Ont.: pigmy shrew, meadow mouse.

Jones, Henry, Cloyne, Ont.: 11 snowshoe hares (skulls).

Manning, T. H. and Andrew MacPherson, Defence Research Board, Department of National Defence, Ottawa, Ont.: 180 mammals from southwestern British Columbia and northern Yukon.

MacLennan, J. M., Canadian Wildlife Service, Ottawa, Ont.: little brown bat.

Osborn, Dale J., Montreal, Que.: 6 mammals (skins and skulls) from Ste. Thérèse, Que., and Ohio State, U.S.A.

Post, L. B., Reindeer Range Station, N.W.T.: caribou, antlers and leg bones.

Spence, M.D., National Film Board, Ottawa, Ont.: bearded seal (young).

Tener, John, Canadian Wildlife Service, Ottawa, Ont.: 15 mammals from Ellesmere Island, N.W.T.

Vockeroth, J. R., Ottawa, Ont.: 10 small mammals collected in Abisko and Pajala, Sweden.

Warburton, F. E., Owen Sound, Ont.: 49 small mammals (skulls).

Wilson, Mrs. Reginald C., Ottawa, Ont.: walrus baculum.

Wright, Bruce S., Northeastern Wildlife Station, Fredericton, N.B.: 2 meadow mice and a cinereus shrew from Fort Chimo, Ungava.

By Purchase:

Canadian Wildlife Service: Alaska fur seal (skin and skull), collected by E. H. McEwen, near Tent Lake, Y.T.

MacDonald, Roderick, Bayhead, N.S.: Nova Scotia wildcat.

Museum Expedition:

Cameron, Austin W., and Marshall Ronalds, Museum Expedition to Rimouski and Gaspé Counties, Que., and Newfoundland: 118 mammals.

MacDonald, Stuart D., Museum Expedition to Alert, Ellesmere Island, N.W.T.: 30 mammals.

By Members of Staff:

Russell, L. S.: 4 small mammals (skins and skulls) from Cypress Hills, Sask.

By Gift: ***Birds***

Bard, F. G., Saskatchewan Provincial Museum, Regina, Sask.: 37 bird skins from New Zealand.

Blakely, David J., Ottawa, Ont.: 11 birds from Richmond, Ont.

Bourguignon, A. E., Ottawa, Ont.: chimney swift, spruce grouse, long-eared owl.

Bowman, R. I., Canadian Wildlife Service: 8 birds from British Columbia.

Boyer, George, Canadian Wildlife Service, Sackville, N.B.: old-squaw.

Brown, H. M., Ottawa, Ont.: Cape May warbler.

Campbell, Mitchell, Ottawa, Ont.: 15 bird skins from lower Moisie River, Que.

Carpenter, G. J., Ottawa, Ont.: Canada goose, steller eider, emperor goose from Alaska.

Chevalier, A., Ottawa, Ont.: 3 cardinals.

Davis, Corwin C., Ottawa, Ont.: 348 birds' eggs (with case).

Du Vernet, John, Ottawa, Ont.: myrtle warbler.

Falt, Lawrence, Hull, Que.: Brünnich murre.

Findlay, D. D., Carleton Place, Ont.: evening grosbeak.

Groh, H., Ottawa, Ont.: myrtle warbler.

Johnson, Claude E., Ottawa, Ont.: 12 birds.

Jones, Henry, Cloyne, Ont.: barred owl.

Lewis, Harrison F., Canadian Wildlife Service, Ottawa, Ont.: brown creeper.

Loan, C. C., Division of Entomology, Department of Agriculture, Ottawa, Ont.: Canada jay, gull, spruce grouse, from Rampart House, Y.T.

Loughrey, Alan G., Canadian Wildlife Service, Ottawa, Ont.: pigeon hawk, dickcissel from Johan Beetz Bay, Que.

MacDonald, Kenneth A., Bayhead, N.S.: marsh hawk.

MacDonald, Roderick M., Bayhead, N.S.: 2 Canada jays.

MacKay, R. H., Canadian Wildlife Service, Vancouver, B.C.: whistling swan, trumpeter swan, holboell grebe (skeleton), redhead, green-winged teal.

Manning, T. H., and Andrew MacPherson, Defence Research Board, Department of National Defence, Ottawa, Ont.: 85 birds from southwestern British Columbia and northern Yukon; 2 robins from Ottawa district.

Martin, J. E. H., Division of Entomology, Department of Agriculture, Ottawa, Ont.: 9 bird skins, 2 wings and 2 tails from Rampart House, Y.T.

McEwen, E., Toronto, Ont.: 8 bird skins from Bathurst Inlet, N.W.T.

Ommanney, G. G., Hudson Heights, Que.: 11 birds.

Ordige, Sherrill, Ottawa, Ont.: American goldfinch.

Osborn, Dale J., Montreal, Que.: 31 birds from Knob Lake, Quebec-Labrador.

Rankin, Niall, Argyll, Scotland: yellow warbler (wings only) from Southampton Island, N.W.T.

Saville, D. B. O., Department of Agriculture, Ottawa, Ont.: 4 birds from Newfoundland and Ottawa, Ont.
Showler, John, Ottawa, Ont.: meadow lark.
Soper, J. Dewey, Canadian Wildlife Service, Edmonton, Alta.: ancient murrelet from Pelly Lake, Y.T.
Spence, M. D., National Film Board, Ottawa, Ont.: goshawk.
Taschereau, Pierre, Ottawa, Ont.: robin.
Tener, John, Canadian Wildlife Service: 35 birds from Eureka, Ellesmere Island, N.W.T.
Tuck, Leslie M., Canadian Wildlife Service, St. John's, Nfld.: yellow-breasted chat, Brünnich murre, purple gallinule, dickcissel.
Tufts, R. W., Wolfville, N.S.: 7 birds from Nova Scotia.
Waller, Sam, The Pas, Man.: brown-headed chickadee.
Warburton, F. E., Owen Sound, Ont.: 3 bird wings.
Watts, C., Ottawa, Ont.: parula warbler.
Webster, H. R., Canadian Wildlife Service, Truro, N.S.: black duck (skeleton).

By Exchange:

Cornell University, Ithaca, N.Y.: 2 eastern Henslow sparrows (near topotypes) exchanged for 2 Taverner's purple finch.

Museum Expedition:

Cameron, Austin W., Museum Expedition to Trois Pistoles, Que.: 2 birds.
Godfrey, W. Earl and Colin Thacker, Museum Expedition to southeastern and central western Manitoba: 406 birds.
MacDonald, Stuart D., Museum Expedition to Alert, Ellesmere Island, N.W.T.: 73 birds.

By Members of Staff:

Godfrey, W. Earl, Ottawa, Ont.: 10 birds from Ottawa district.
Humphreys, Miss V. M., Ottawa, Ont.: yellow-bellied sapsucker.
MacDonald, Stuart D., Ottawa, Ont.: ruffed grouse from Richmond, Ont.: Hudsonian chickadee from Tatamagouche, N.S.

Amphibians and Reptiles

By Gift:

Martin, E., Ottawa, Ont.: milk snake.

Invertebrates

By Gift:

Cheesman, Miss Diane, Land's End, N.S.: 4 sand dollars, Echinorachnius.
Clarke, Dr. G. L., Oslo, Norway: 4 lots of barnacles from Norwegian coast.
Cooper, Miss Rosa, Clarenville, Nfld.: 20 sphaeriidae.
Dunbar, Dr. Max, Montreal, Que.: barnacle material (in formalin).
Fox, C. J. S., Sheffield Mills, N.S.: 11 slugs from potato field.
Geographical Branch, Department of Mines and Technical Surveys: marine and fresh water mollusca from south shore Darnley Bay, Western Arctic at E. mouth Hornaday River.
Hare, Mrs. W. L., Carleton Place, Ont.: bryozoan, *Pectinatella magnifica.*
Keith, Dr. H. J., Ottawa, Ont.: shell of *Tridacna* from Caroline Islands, Pacific Ocean.
Nedcof, C. J., Fisheries Research Board, St. Andrews, N.B.: 24 molluscs.
Norris-Elye, L. T. S., Winnipeg, Man.: 24 specimens of *Lepidurus couesii.*
Tener, John, Canadian Wildlife Service: fish, 11 crustaceans, mollusc, several cestodes, 2 insects from Eureka and Slidre Fiord, Ellesmere Island, N.W.T.

By Purchase:

Hudson, G. L., Digby, N.S.: 12 lots of crustaceans, box containing barnacle material from Bay of Fundy, N.S.

By Exchange:

Squires, H. J., Newfoundland Fisheries Research Station, St. John's, Nfld.: 7 lots crustaceans, *Balanus* spp. on *Peeten, Buccinum* and *Heptunea,* from Grand Banks, Nfld.

Museum Expedition:

Bousfield, E. L., Museum Expedition to Quebec and New Brunswick: 435 vials marine plankton; 34 vials, 15 pints, 2 quart-sealers of marine bottom invertebrates; 37 vials intertidal invertebrates; 38 lots insects and stream bottom fauna.

MacDonald, Stuart D., Museum Expedition to Alert, northeastern Ellesmere Island, N.W.T.: 41 lots of marine and freshwater invertebrates.

Fossil Vertebrates

Museum Expedition:

Russell, L. S., Museum Expedition to Cypress Hills of Saskatchewan: large series of fossil mammal remains, mostly titanothere, from the Oligocene deposits.

NATIONAL HERBARIUM

Field Work

A. E. Porsild, Chief Botanist, was engaged in field work from June 11th to September 22nd, chiefly in Banff National Park, in continuation of studies carried out there in 1945 and 1946 for the preparation of an illustrated manual and guide to the flora of the Park. Much time was devoted to photographing plants in their natural habitat and to drawing up detailed descriptions of alpine species. Collections of critical plants were made as well, to supplement those of previous years. At the conclusion of the season, Mr. Porsild proceeded to Alaska, where he attended the Second Alaskan Science Conference held at Mt. McKinley Park, September 4th to 8th. En route to Alaska, he made a stopover at Carcross, Y.T., where he examined the rather unique flora of the sand-dune area of Lake Tagish. A total of 1,458 sheets of plants, besides numerous photographs in colour and in black and white, resulted from the season's work.

H. J. Scoggan made a botanical survey during the period June 17th to August 29th of the prairie and forested regions of Manitoba as far north as the end of roads at Pine Falls, Riverton, Gypsumville, and Flin Flon. Special attention was given to the collection of prairie species and to the northward extension of the recorded ranges. Extensive records were also made of the presence of more common, non-critical species in the various ecological habitats occupied by the plants collected. Collections of vascular plants, 2,183 in number, were made; the total number of sheets, including material for exchange, being 5,820; 675 species, 39 varieties, and 16 forms were represented. Photographs were taken to show the general topography and vegetation types. For study purposes, 414 sheets of plants were brought back on loan from the University of Manitoba and the Manitoba Provincial Museum. Five days were spent in research at the U.S. National Museum.

I. M. Lamb accompanied A. E. Porsild in the field and spent the period from June 18th to August 6th in a study of the lichen flora of Banff

National Park. The total number of collections made was 482; with sufficient material to make up 968 duplicate specimens for distribution in exchange to other institutions. Photographs were made to illustrate different habitats and topography.

W. K. W. Baldwin made a botanical survey from June 23rd to August 25th of northwestern Manitoba in the Reindeer Lake and Nueltin Lake areas. The collection of vascular plants represented 236 species and major varieties, totalling 3,140 sheets of specimens from 448 collections. Physiographic features and types of vegetation were recorded in black and white and in colour photographs. Field notes were made on matters relating to the flora of the region.

Office Work

During the year, Mr. Porsild spent considerable time working on his report on the Flora of the Canadian Arctic Archipelago, which necessitated the critical revision of several genera of arctic plants. He also prepared a chapter on "Arctic Plant Life" for publication in a new edition of "Northwest Territories" in preparation by the Northern Administration and Lands Branch of the Department; a paper entitled "Land Use in the Arctic" for presentation before the Royal Society of Canada; and several shorter articles and reviews for the Arctic Institute of North America and the Arctic Circular. He attended meetings of the following bodies: Royal Society of Canada, Montreal; Second Alaskan Science Congress, McKinley Park, Alaska; a meeting of the Canadian Governors of the Arctic Institute of North America, Ottawa, and a general meeting of the Board of Governors held in New York; two meetings of the Committee on Organic Soils (under the auspices of the Defence Research Board and the National Research Council); and several sessions of the Advisory Board on Wildlife Protection. He checked 9,926 plant specimens prior to mounting or insertion into the Herbarium, and named or revised numerous collections of critical plants submitted for report by various government departments or by Canadian and foreign universities and botanical institutions or received as gifts or by exchange. Among the more significant is a fine set of 1,093 plants collected in arctic Alaska by Lloyd A. Spetzman and a somewhat smaller collection by Dr. A. A. Lindsey of Purdue University, the result of field work in the Mackenzie Basin.

H. J. Scoggan prepared for publication a report on the 1951 field season in Manitoba. Considerable work was done on the index, now numbering about 5,000 cards, which has been compiled as a preliminary step to a Flora of Manitoba. He determined the plants collected by himself in Manitoba during the summer, and also determined collections totalling 1,275 numbers from various parts of Canada. Other collections, amounting to some 900 numbers, were checked also and revised where necessary, and 125 numbers were checked against duplication in the Herbarium.

I. M. Lamb spent considerable time at work on a monograph of the lichen genus *Stereocaulon*, during which he continued revision of various

collections of the genus sent in for this purpose. He prepared the first part of a report on the lichen flora of Patagonia and determined various collections, including his own summer one from the Rocky Mountains. He considered incorporation of new lichen material into the Herbarium and commenced the elaboration of a taxonomic system of the mosses by which to arrange the Moss Herbarium. From January 14th to 26th, he visited the Farlow Reference Library and Herbarium, Cambridge, Mass., to consult literature and study type specimens. He also prepared duplicate material for exchange and was consulted by visitors in search of information concerning cryptogamic plants.

W. K. W. Baldwin prepared for publication a paper on his summer's work in northwestern Manitoba and completed the final drafts of two papers on botanical work in Foxe Basin and James Bay. He maintained insertion of herbarium specimens up to date, prepared two large collections for study by the Chief Botanist, and prepared notes and labels for a Museum exhibit of western tree specimens. He determined the plants collected by him during the summer and made preliminary studies for projected work on the flora of the Clay Belt of Ontario and Quebec. He conducted the meetings and excursions of the Macoun Field Club for junior naturalists and assembled an exhibit of their collections for the Dog Creek School Association of Manitoba.

During the past year, Miss H. T. Harkness indexed 882 "type specimens" or duplicates of "types" and added them to the rapidly growing "type collection" now comprising the types or duplicate types of 1,352 plants. These are placed in special and conspicuously marked covers so that their removal in an emergency can be effected without loss of time.

A "type" is the actual plant specimen upon which the concept of a species rests and each was selected by the original author who first published a description of the species; "type specimens", therefore, constitute a very valuable and irreplaceable part of the herbarium in which they are deposited. Rules governing the selection and classification of "types" have been laid down by International Botanical Congresses, and herbaria possessing "types" are under obligation to preserve and care for them and to make them available for study by competent botanists at all times.

The National Herbarium of Canada is exceptionally rich in types of Canadian and boreal plants, but, because the establishment of the type concept is comparatively recent, many early types were not thus designated by their authors and, for this reason, are not readily recognized; many can be identified as types only after careful study of the original descriptions.

Accessions, Loans, and Exchanges

During the year 3,638 herbarium specimens were received by exchange, 2,832 by donation, and approximately 13,010 resulted from field work or were obtained in exchange for determinations by members of the National Museum staff. A total of 1,827 specimens were loaned to other botanical

institutions, and 1,227 specimens were borrowed from them. Duplicate specimens numbering 581 (resulting from the field work of the Herbarium staff) were distributed to Canadian and foreign herbaria in continuation of exchanges. A total of 9,926 specimens of vascular plants were mounted and inserted in the herbarium, bringing the total of numbered flowering plants and ferns in the national collection to 215,306. When the reorganization of the Cryptogamic herbarium has been completed, comparable figures will be available of the numbers of mosses, lichens, and algæ in the National Herbarium.

Among the more notable accessions is a set of 1,093 vascular plants from the north slope of Brooks Range, Alaska, donated to the National Herbarium by the collector, *Mr. Lloyd A. Spetzman* of St. Paul, Minn. The National Museum gratefully acknowledges the donations of this and the following specimens and collections:

A. W. Evans, Yale University, New Haven, Conn.: lichen from Quebec.
Mason Hale, University of Wisconsin, Madison, Wis.: 515 lichens from N.W.T.
Rev. E. Lepage, Rimouski, Que.: 146 vascular plants and 507 bryophytes and lichens from Quebec.
S. D. MacDonald, Ottawa, Ont.: 6 lichens from N.W.T.
A. H. Magnusson, Gotborg, Sweden: 2 lichens from Norway.
J. A. Munroe, Okanagan, B.C.: 9 vascular plants from British Columbia.
I. Potocnik, Kapuskasing, Ont.: plant from Slovenia.
W. O. Sutton, London, Ont.: 50 myxomomycetes from Ontario.
J. W. Thompson, University of Wisconsin, Madison, Wis.: 502 lichens from Manitoba.
George Turner, Fort Saskatchewan, Alta.: 40 vascular plants from Alberta.

Visitors

During the year, some 130 visitors from Canada and abroad visited the National Herbarium to study plant material or to consult on technical matters with members of the staff.

Publications

The following articles were published by the staff of the National Herbarium during the year:

Botany of Southeastern Yukon Adjacent to the Canol Road, by A. E. Porsild. National Museum of Canada, Bulletin No. 121; 400 pages, 1951.

Two New Oxytropis from Arctic Alaska and Yukon, by A. E. Porsild. Canadian Field-Naturalist, No. 65; pp. 76-79, 1951.

A Biological Exploration of Banks and Victoria Islands, by A. E. Porsild. National Museum of Canada, Bulletin No. 123; pp. 133-138, 1951.

Catalogue of the Vascular Plants, by A. E. Porsild. *In* Hustich, I: Forest Botanical Notes from Knob Lake Area in the Interior of Labrador Peninsula. National Museum of Canada, Bulletin No. 123; pp. 201-216, 1951.

Antennaria, by A. E. Porsild. *In* Hultén, E.: Flora of Alaska and Yukon, Part 10: pp. 1511-1535 (maps Nos. 1122-1149), 1951.

Plant Life in the Arctic, by A. E. Porsild. Plants and Gardens: Brooklyn Botanical Garden Record No. 7; pp. 259-264, 1951.

Vegetation of Arctic Alaska and Yukon, by A. E. Porsild. National Research Council, Washington, D.C., Bulletin No. 122; pp. 53-55, 1951.

Caribou in Greenland, by A. E. Porsild. Arctic Circular No. 4; pp. 52-58, 1951.

Families of Flowering Plants, by H. J. Scoggan. Canadian Nature, May-June, pp. 102-104, 1951.

Botanical Surveys in Central and Northern Manitoba, by H. J. Scoggan. Arctic Circular No. 4; pp. 37-45, 1951.

Botanical Investigations Along the Hayes River Route, Northern Manitoba, by H. J. Scoggan. National Museum of Canada, Bulletin No. 123; pp. 139-161, 1951.

On the Morphology, Phylogeny, and Taxonomy of the Lichen Genus Stereocaulon, by I. M. Lamb. Canadian Journal of Botany No. 29; pp. 522-584, 1951.

Lectures

Land Use in Arctic North America, by A. E. Porsild. Read before Section V of the Royal Society of Canada, in Montreal, June 5, 1951, and before the Second Alaskan Science Congress, McKinley Park, Alaska, September, 1951.

The National Museum of Canada and its Botanical Surveys in Manitoba, by H. J. Scoggan. National Museum of Canada, Bulletin No. 123; pp. 139-161, 1951.

From Prairie to Arctic Tundra, by H. J. Scoggan (based on Manitoba travels). Museum Lecture Series, March 19, 1951 (adults), and March 22, 1951 (children).

Let's All Go Exploring, by W. K. W. Baldwin. Museum Lecture Series, March 29. 1951 (children).

ARCHÆOLOGICAL RECONNAISSANCE IN THE MACKENZIE RIVER DRAINAGE

By Richard S. MacNeish

The archæological survey of the Northwest Territories by the National Museum of Canada was initiated in the summer of 1949. The first season's work was concentrated primarily on the area east of Great Slave Lake and north of Lake Athabasca, and the results of this reconnaissance have been published.[1] The second and third season's work were primarily concerned with a survey of the Mackenzie River drainage area. This report will deal only with 1950 and 1951 season's field work.

In the previous report the general purpose of archæological work in the Northwest Territories was defined as being to discover the cultural complexes and their sequence in that area and, if possible, to apply this knowledge to the problem of the migration of peoples and diffusion of culture from Asia to America. On a more specific level it was hoped that the survey would yield an "Early Man" site. By "Early Man" site is meant a site producing an artifact complex and specific artifact types in a context indicating considerable geological antiquity (such as the association of the artifacts with an extinct flora or fauna, or in geological strata of Pleistocene or Early Recent times), or a site having an artifact complex and specific artifact types similar to those that have been proved to be of considerable antiquity elsewhere. It also was hoped that a series of sites of different artifact complexes indicating a possible sequence as well as the range of variation of artifact complexes and types of artifacts might be found. In summary, the specific purpose of the survey was to find sites for excavation that might aid in the solution of these general problems.

A brief itinerary will serve to indicate the area covered (see also map). In 1949 a brief twelve-day canoe trip was made down the Mackenzie from Fort Providence to Norman Wells. Intensive survey, however, did not begin until 1950, when the author went from Edmonton to Peace River, stopping briefly in Peace River town to look at collections, and then to Hay River and on to Fort Simpson. From Fort Simpson a trip with "Dick" Turner was undertaken up the Liard and up the South Nahanni River as far as just north of Deadman's Valley. Then I returned to the Liard River and went upstream to Fort Liard. At Fort Liard short trips were made to sites nearby. After returning to Fort Simpson the survey continued down to Fort Norman where the season ended. In 1951 the survey started at Fort Norman with a trip up the Great Bear River and along the western shores of Great Bear Lake. Next, I went back to Fort Norman and gradually worked my way down the Mackenzie River, stopping at all forts, villages, or likely looking sites down to the mouth of Peel River near Aklavik. After a brief stop-over at the mouth of the

[1] MacNeish, Richard S. An Archæological Reconnaissance in the Northwest Territories. Annual Report, National Museum of Canada for the Fiscal Year, 1949–50, Bull. 123, pp. 24–41. Ottawa, 1951.

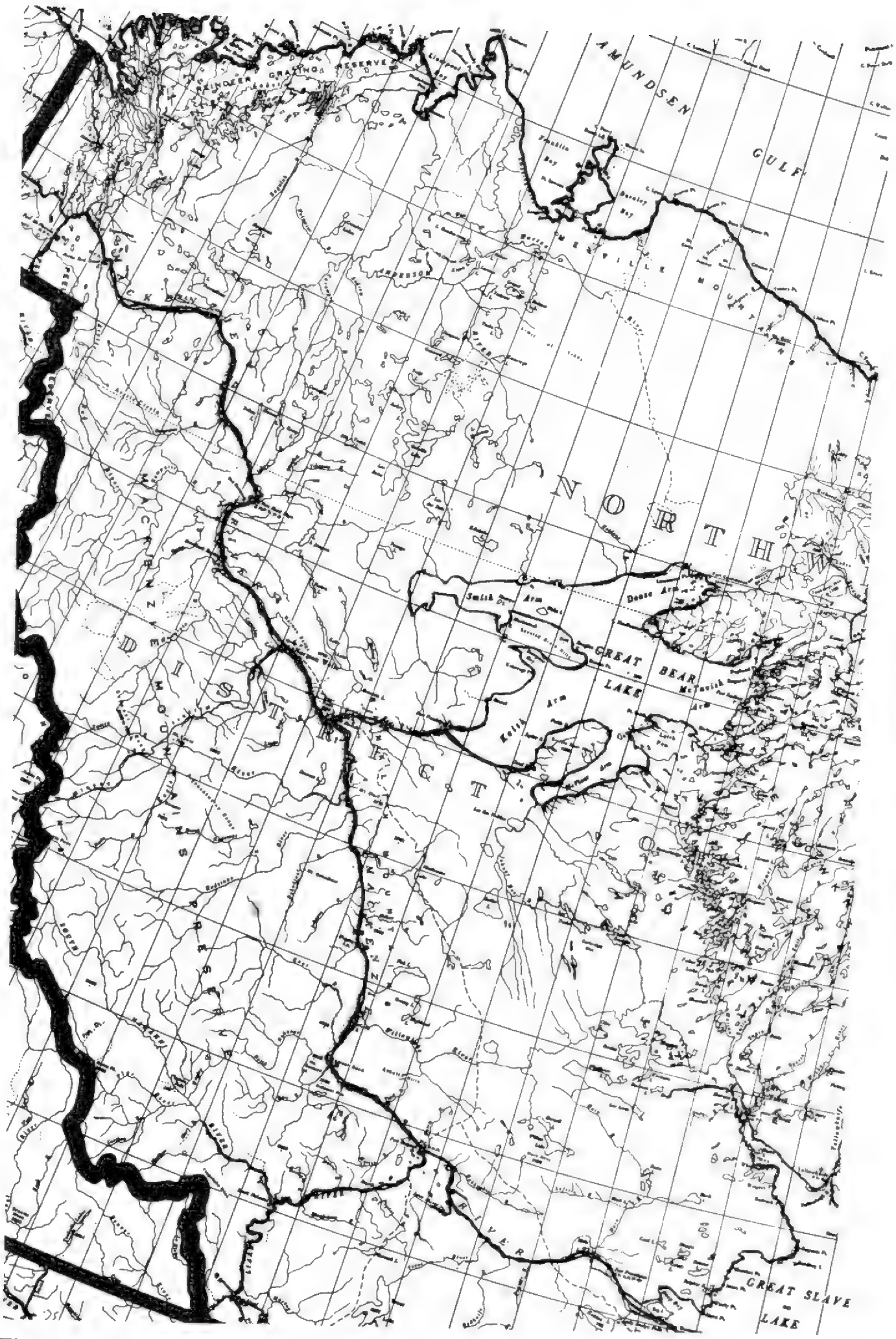


Figure 1. Route of survey indicated by heavy black line on map of the eastern part of the Northwest Territories.

Peel and at Fort McPherson, the survey went up Peel River for 90 miles and back. Then a brief side trip from Fort McPherson over McDougall (Rat) Pass to Bell River and back was undertaken. As it was getting late in the season, I returned to Norman Wells and made a brief trip up the Canol Road for 80 miles. This ended the preliminary survey.[1]

THE SITES

Site 3. The location of this site has been previously described. It is in the garden of G. Sanguise at Jean Marie River, an Indian village on the Mackenzie, where, during my second visit, I found a fragment of a large ovoid blade.

Site 4. On the high terrace on the northeastern bank at the junction of Rabbitskin River and Mackenzie River, in front of Leon Norwegian's house, along the bank, are the remains of an older occupation. In 1950, turf was stripped from this area and a number of artifacts collected. These include a gun flint, five fragments of large ovoid chert blades, three flake chert scrapers with convex edge, one chipped slab of slate, part of a leaf-shaped projectile point, and a number of fragments of burned clay, some of which very much resemble pottery. Most of these fragments are thin (one-quarter inch in thickness) with parallel surfaces (usually slightly concavo-convex), and have a brushed surface and fibre temper, and one or two pieces look like rim sherds. However, in spite of the features which resemble pottery, I believe that most of these fragments of fired clay are some sort of daub used in the construction of an ancient habitation, rather than pottery. However, a few might actually be sherds.

Site 5. At Fort Simpson there evidently were numerous small Indian camps, most of which, I believe, are fairly recent. A few flake side scrapers, an ovoid flint blade, a bilateral harpoon or fish spear (Plate IV, figure 3), and a bone flesher were found in the town.

Site 6. At R. Saberea's cabin, on the left bank of the Mackenzie, 15 miles below Fort Simpson, flint chips and a fragment of an ovoid blade occurred.

Site 7. In the garden of the village at the entrance of Trail Creek into the Mackenzie, a flint flake side scraper was found.

Site 8. In the garden of the village on the northeast bank, at the entrance of Willow River into the Mackenzie, a fragment of a quartzite scraper and a projectile point were picked up.

Site 9. At the mouth of Ochre River on the north bank, flint chips were found.

Site 41. The site is situated at the north end of Fisherman's Lake, about eighteen miles northeast of Fort Liard. It is on a high terrace some

[1] In undertaking the survey, the people I met in the Northwest Territories were exceedingly co-operative and hospitable, and I should like to thank them for all that they did for me. It is unfortunate that this brief article does not allow me to express my thanks to each one individually. However, as I describe the work I shall mention a few of the large group who accompanied me to various sites.

fifty feet above the present lake, in the garden of Johnny Klondike. Though the site abounds in flint, quartzite, and obsidian chips, only two fragments of large ovoid knives were found.

Site 42. This site is 3 miles west of Site 41 on the third or fourth terrace above the lake. It is north of a large hill and a flint quarry. The artifacts are just under the humus. Much of the earth in this area is an orange colour and is filled with flint chips. Artifacts encountered include the following:

Lamella Flakes (Plate III, figures 1 to 3, 7, 8)

Nine lamellar flakes, three of them whole, two ends, and four central portions without ends occurred. Five of them made from obsidian are triangular in cross-section, and the four made from chert are truncated pyramids in cross-section. None are over 2 mm. in thickness, and most of them are about 1 mm. thick; width ranges from 7 to 12 mm. The shortest whole specimen is 36 mm. long, and the longest is 62 mm. The ventral surfaces are all slightly concave and represent a single flake scar. The dorsal surface of the obsidian ones has a single ridge down the middle with a long parallel flake scar on each side of the ridge. The dorsal surface of the chert flakes has three parallel flake scars running down its length. From the three whole specimens and the two fragmentary ends, it would appear that both ends are rounded by delicate retouching on the dorsal surface along the edges of the ends.

It has been suggested that these lamellar flakes are inset blades of a rather specialized type. Certainly they were made from a prepared core which eventually should be found in the excavation of this site.

Burins (Plate III, figures 4 and 9)

One is made from a prismatic flake 4 mm. wide, about 2·5 mm. thick, and 30 mm. long. One end of the flake has been retouched on the dorsal side to form an oblique point. The retouching is very fine, delicate, and well controlled. There appears to be some evidence of rubbing on the dorsal surface adjacent to the oblique chipped point.

The second burin is made from a small triangular flake 20 mm. long, 11 mm. wide at the base, and about 2 mm. thick. One side of the flake has been retouched from its dorsal surface. The opposite bears a single flaking scar for seven-eighths of its length and then has a second scar oblique to the first running to the point (struck from above the point). The dorsal chipped side at its point has more delicate retouching; the opposite side bears only a single small retouching scar.

End Scrapers (Plate III, figures 5, 10)

The three end scrapers are roughly triangular in outline, but their dimensions vary.

The large one is 49 mm. long and has a maximum width near its cutting edge of 28 mm. and a maximum thickness of 9 mm. Its ventral surface

is concave and has a single flaking scar. Its dorsal surface has a couple of parallel flake scars running lengthwise along its slightly keeled back, while its sides and ends show steep retouching (Plate III, figure 8).

The second one is made from the exterior portion of a flint nodule. It has a maximum length of 41 mm., maximum width at the cutting edge of 26 mm., and a maximum thickness of 7 mm. The concave ventral surface bears a single flake scar. The dorsal surface has retouching along its three edges, and at one end it has a keeled back, while the other end is the nodule surface (Plate III, figure 9).

The third is a small fragment of what appears to be a snub-nosed end scraper.

Ovoid (?) Bifaced Blade (Plate III, figure 6)

There are parts of four ovoid blades, all fragments of less than half the original blade, and, since they range considerably in size, I shall not describe them (Plate III, figure 10).

Flake Side Scrapers

Two thin triangular flakes with retouching along the edge on one of the longer sides are flake side scrapers (Plate III, figure 11).

Site 43. A narrow leaf-shaped blade with parallel oblique ripple flaking was found by Francis Nandi on top of the west bank at Black River along the trail to Sandy Lake about twenty miles south of Fort Liard (Plate III, figure 12).

Site 44. This site is on the southeast shore of Bovie Lake just east of the stream entering the lake from the south. Bovie Lake is about thirty miles southeast of Fort Liard. Part of seven large bifaced blades, three flake side scrapers, and part of two long, narrow, side-notched points occurred, as well as flint and slate chips.

Site 45. This site is on top of the esker just south of Site 44. Flint chips and part of two large ovoid bifaced blades were collected.

Site 46. This site is on the same esker as Site 45 but is farther west, and west of the small stream entering Bovie Lake from the south. It is behind Alex Timbre's cabin. A large ovoid blade and parts of two other blades and some flint chips were picked up.

Site 47. This site is on the high terrace on the southeast bank at the junction of the Spence and Mackenzie Rivers. Most of the artifacts and chips were found along the northwest edge of the terrace. Parts of three, and one whole, large ovoid bifaced blades, four flake side scrapers, parts of three small end scrapers, part of two large side-notched projectile points, a small corner-notched point, and a very small broad side-notched point of black chert were found. One large flat fragment of a chopper or scraper of sandstone occurred with the quartzite, black chert, and shale chips (Plate III, figures 18 to 24).

64201—3

Site 48. A large ovoid blade from the south shore of Deep Lake in the upper reaches of Jean Marie Creek was given to me by Louis Norwegien of Jean Marie River village.

Site 49. This site is on a high terrace around J. Betalli's old cabin on Mackenzie River opposite the entrance of North Nahanni River. Part of an ovoid quartzite blade was found.

Site 50. During the construction of the airfield at Fort Wrigley, "spearpoints" were reputedly found along the southeast edge of the field. I found flint and quartzite chips and a small quartzite scraper in the bulldozed piles along the edge of the airfield but could not definitely locate any site. It may be under the dirt piles or may have been removed by the airfield construction.

Site 51. A large black chert blade was found by Dr. Truesdell on the low terrace on the southwest bank at the junction of the first large stream from the west into the Mackenzie River, 8 miles below Fort Wrigley (Plate III, figure 26).

Site 52. Along the northeast bank of a small west-flowing stream entering the Mackenzie River just above Site 51 on the opposite side of the river, a quartzite scraper and quartzite chip were collected.

Site 53. This site is on a 40-foot terrace along the south side of Great Bear River about a mile west of Great Bear Lake and three-quarters of a mile from the Northern Transportation Company camp. The site is between the edge of the terrace and the road, just before the road turns away from the river. The site abounds in flint, quartzite, quartz, chert, and shale chips. Artifacts include fragments of four large ovoid bifaced blades, nine small end scrapers (Plate III, figures 15 to 17), five thin flint side scrapers, one large quartz side scraper, a small rectangular chipped grey chert scraper, and one short pentagonal projectile point (25 mm. long and 15 mm. wide) somewhat similar to a Lake Mohave point (Plate III, figure 14).

Site 54. From the standpoint of Early Man, this is potentially the most important site yet found in northern North America. The site is on a beach about forty feet above Great Bear Lake in the Northern Transportation Company camp on the southwest bank where Great Bear River flows out of Great Bear Lake, east of the Northern Transportation mess hall and barracks, west of the gravel road leading from the portage road down to the docks, and north of the oil tanks and gravel portage road. The oil tanks actually stand on part of the site, and a tractor road has been cut through part of the site. Some preliminary test holes were dug to determine the extent and stratigraphy of the site, which is roughly as follows: The top 2 to 6 inches of the site is covered by a compact layer of moss and partially rotted vegetation. This overlies a 1-foot layer of sand, which I believe is æolian, since it lacks any definite bedding. The wind-blown sand is on top of a 1-inch grey sand layer containing flint

chips, parts of a scraper, knife, and projectile point, a piece of fossilized bone, and a piece of mammoth or mastodon tusk. Below the grey sand is a 2- to 8-inch level of beach pebbles and coarse sand that lies on a layer of beach pebbles.

All artifacts, except for those mentioned above which I found in my testing, came from the area disturbed by the tractor trail just south of the oil tanks. However, since they are similar to those of the excavation both in type and in kind of material and since there are no other cultural deposits except the grey sands on either side of the tractor trail, I believe it is safe to assume that all artifacts originally came from the grey sand layer.

Since the artifact collection from the site is distinctive and has a possible bearing on the problem of Early Man in America, I shall describe it in some detail.

Projectile Points

The point tip found in the grey sands is made from a bluish black slate-like chert. One side of the point is patinated. The point is about 3 mm. thick and 21 mm. wide. The edges seem to have been parallel, but the base type is unknown. One surface has oblique parallel ripple flaking on it with a retouched edge; the other side has a few crude flakes on the surface and retouching along its edges (Plate II, figure 3).

The second point, with its tip broken, I found on the surface next to the tractor road. It is made from bluish black chert and is somewhat patinated. The point has a maximum thickness of 4 mm., a maximum width just above the base of 21 mm. (though the sides are roughly parallel, being about 20 mm. wide for 40 mm. up from the base), and an estimated length of about 72 mm. The sides are roughly parallel or very slightly excurvate for two-thirds of its length and then appear to taper to a point. The base is concave and has a depth of concavity of about 4 mm. One end of the base has been broken so that it has an asymmetrical appearance at present, but I do not believe it originally was so. One edge has been ground for a distance of 25 mm. up from the base (Plate II, figure 2).

The third point was found by Abe Davidson of Rutland, Sask., on the tractor trail in 1950, and he has been kind enough to lend this artifact to the National Museum of Canada. The point is of bluish black chert and has a maximum thickness of 4 mm., a maximum length of 70 mm., and a maximum width of 22 mm. The maximum width is near the midpoint, though the sides are roughly parallel (very slightly excurvate) for 40 mm. of its length. The base is concave, being 2 mm. in depth, but, like the other point described above, one corner of the base has been broken. The chipping on both surfaces shows wide, irregular, rough oblique parallel flake scars, and all edges are retouched. Both edges are ground from the base to a distance of some 25 mm. above the base (Plate II, figure 1).

The fourth point was found by W. B. Hunter of Edmonton, Alta., while surface-collecting with me. He was most kind in presenting this point to the National Museum of Canada. It was found close to the

tractor trail. It is rather different from the other three, being shorter (33 mm. in length), narrower (19 mm.), but about the same thickness (4 mm.). It is made from grey, translucent, fine-grained quartzite. Its sides are roughly parallel, and its base is concave (3 mm. deep). The chipping is not distinctive, and its basal edges are not ground (Plate II, figure 4).

Scrapers

One scraper is of black chert and is an irregular, pointed flake about 5 mm. in maximum thickness. The ventral side is a convex flake scar, while the dorsal side has three or four longitudinal flake scars and fine retouching along its point and the convex edge of one side. This was found in the excavation only a few inches from the piece of tusk (Plate II, figure 6).

The second scraper, found by Abe Davidson and lent to the National Museum of Canada, is made from glossy black chert (or impure obsidian). It is a rectangular, snub-nosed end scraper 30 mm. long, 25 mm. wide, with a maximum thickness near its nose of about 10 mm. (Plate II, figure 5).

Bifaced Ovoid Blades

One ovoid blade was found by Felix Casone and generously donated to the National Museum. It is 60 mm. long, 38 mm. wide, and 9 mm. thick. The other is only a basal section that I found in the grey sands and, though of the same material and about the same maximum width and thickness, appears to have been longer (Plate II, figures 8 and 9).

Choppers

One piece of a crude portion of a thick (25 mm. maximum) biface was found that had secondary chipping along one of its edges on both sides. It is made from porphyry (Plate II, figure 7).

Other Objects

Other objects found include a piece of mammoth or mastodon tusk[1] (Plate II, figure 10); four pieces of fossil bone, three chips of black chert, one quartz fragment, one piece of milky-white chert, one piece of grey quartzite, and seven flakes of coffee-brown quartzite.

Site 55. This site was found on the sixth beach (about twenty feet) above the present one in Keith Arm of Great Bear Lake, 600 feet north of the portage trail across Grizzly Bear Point from Keith Arm to McVicar Arm. It produced flint chips, a scraper, and part of a birch bark container.

Site 56. This site is on the gravel just west of the Administration Building at the Northern Transportation camp on the Great Bear River portage. A large flake scraper, part of a concave-based point, and part of a slate chopper were found (Plate III, figure 25).

[1] Identified by Dr. Loris S. Russell of the National Museum of Canada.

Site 57. In the Roman Catholic Mission's garden at Fort Good Hope, there are numerous pieces of worked bone as well as part of a bone beaming tool and a fragment of a bone awl.

Site 58. At Arctic Red River there are a series of super-imposed burned hearths in the bank along the road leading down to the dock on the low terrace below the Roman Catholic Mission. Excavation uncovered a series of bone tools. One is a piece of netting needle (Plate IV, figure 1); two are pins for the cup-and-pin game (Plate IV, figures 7 and 8), one is part of a stemmed conical point, and one a double-pointed awl. Four white glass beads were associated with the bone artifacts.

Site 59. This site is just south of the Hudson Bay Company's plot of land at McPherson. Artifacts include one multi-barbed unilateral harpoon head (Plate IV, figure 12), a long bone beaming tool (Plate IV, figure 2), one beaver tooth gouge, one bone pin (Plate IV, figure 9), and a ground deer phalanx (for the cup-and-pin game) (Plate IV, figure 10), one bone shaft with a brass arrowhead (Plate IV, figure 11), parts of two bone awls, one part of a bone knife handle with metal rivets, and one hollow bone stunning arrowhead with the blunted tip divided into three sections (Plate IV, figure 6). Also, Neil Roberts and Willy MacDonald generously presented two more bone stunning arrows, one having a pointed base (Plate IV, figure 4), the other a slit base (Plate IV, figure 5).

Site 60. This site is in McDougall Pass between the sources of Bell and Rat Rivers. Specifically it is on the north end of the moraine (?) west of Loon Lake at the top of the Pass. The collection from this site contains six large flake side scrapers, one chopper, three end scrapers, and parts of four large crude bifaced blades.

Site 61. A multibarbed unilateral harpoon was presented to the National Museum by Angus Sherwood from a site on the west side of the Ramparts just above Fort Good Hope (Plate IV, figure 13).

Site 62. Mr. C. O. Hage presented the National Museum with a side-notched spear point from the southwest shore of Trout Lake, about ninety miles east of Fort Liard (Plate III, figure 13).

INTERPRETATIONS

Interpretations at this time, based upon small collections mainly from the surface, are at best tentative. However, some sort of interpretation of the materials found seems worth while, both from the standpoint of aiding future workers in the area and of re-defining some of the problems.

From the survey, I have received the general impression that most of the sites right along the Mackenzie River are very late and that earlier sites are to be found on the small lakes and streams some distance back from the river. From a practical standpoint, small lakes and streams that have produced sites with fair samples of materials are not accessible

by the modes of transportation usually available today. The most available sites seem to be concentrated round Fort Norman (to Fort Franklin) and Fort Liard. It is those two areas that I would recommend for further intensive survey and excavations.

The late sites along the Mackenzie, many of which are of post-contact times, seem to be small villages occupied for very short times, with rather meagre stone artifact assemblages consisting of ovoid blades, scrapers, and rarely a few small projectile points. However, on the basis of the materials from Fort McPherson and Arctic Red River, as well as information received from various native informants, I believe that the late sites had a fairly large and rich bone tool inventory which was usually not preserved.

Leaving these more general impressions and turning to more specific considerations, there seem to be two sites found in the survey that have wide implications. One is Site 42 on a high terrace behind Fisherman's Lake, 18 miles north of Fort Liard. Its position on a high terrace some distance from a large modern body of water suggests that the site might have some antiquity, but this has to be proved by excavation. The artifacts themselves have wide, and perhaps important, typological significance. The lamellar flakes, with the dorsal surface at either end retouched, are a specific type of implement that comparatively may have some importance. Similar ones have been found at Kluane Lake in the Yukon;[1] at the Campus site at College, Alaska (near Fairbanks),[2] at Birch Lake, 60 miles southeast of Fairbanks, Alaska,[3] at sites in Northwest Alaska,[4] at Cape Denbigh, Alaska,[5] and at a number of stations in Northeast Siberia[6].

The occurrence of these lamellar flake blades in the most southwestern part of the Northwest Territories at Site 42 seems to mark the most southern extent of their distribution. At present the distribution, though sporadic, seems to run from northeast Siberia through Alaska and the Yukon to Fort Liard.

Of perhaps more importance are the two angled burins with one edge trimmed, at Site 42. Similar burins are associated with lamellar flakes at Cape Denbigh[7] and in Siberia.[8] Generally speaking, such implements are thought of as characterizing the Mesolithic of Europe and the Neolithic of Siberia and as being absent in the New World. Thus Site 42, like the Cape Denbigh flint complex, has its closest ties across Bering Strait into the Old World. The roughly keeled, triangular end scrapers (more or less snub-nosed), flake side scrapers, and ovoid blades found at Site 42 have a much wider and more general distribution, but these appear with the

---

[1] Johnson, Frederick. An archæological survey along the Alaska Highway, 1944. American Antiquity, vol. 11 No. 3, pp. 183–186. Menasha, Wisc. 1946.

[2] Rainey, Froelich G. Archæology in Central Alaska. Anthropological Papers, American Museum of Natural History, vol. 36, pt. 4, pp. 381–399. New York. N.Y. 1939.

[3] Skarland, Ivar and J. L. Giddings, Jr. Flint stations in Central Alaska. American Antiquity, vol. XIV, No. 2, p. 116. Menasha, Wisc. 1948.

[4] Solecki, Ralph S. Archæology and geology in Northwestern Alaska. Earth Science Digest, vol. 9, pt. 7, pp. 3–7. Revere, Mass. 1950.

[5] Giddings Jr., J. L. The Denbigh Flint Complex. American Antiquity, vol. XVI, No. 3, pp. 193–203. Menasha, Wisc. 1951.

[6] Okladnikov, A. P. The first neolithic find on the Chukchi Peninsula. Kratkie Soobshcheniya Instituta Istorii Material'noy Kul'-tury Imeni N. Ya. Marra, vvp. 31, pp. 196–8.

[7] *See* note 5.

[8] *See* note 6.

lamellar flakes at the Campus site and Birch Lake sites in central Alaska,[1] and with lamellar flakes and burins at Cape Denbigh, and seem to make up an artifact complex at a series of sites that are possibly genetically connected from Siberia to Fort Liard. At present the problems concerning these materials are far more numerous than the facts. Some of the problems may be partly solved by the excavation of Site N.W.T. 42, so more exact dates and a more complete complex of artifacts may become known. Until then, all that can be said is that there is evidence of a possible migration or diffusion of a microlithic industry from Siberia to Alaska and southward by way of the Yukon as far as Fort Liard on, possibly, an early time level. Only a series of dates and comparison of total artifact complexes from a number of sites in the above areas can change these "possibles" to "probables" and even then a key problem will be that of the developments from this migration.

The second important site is N.W.T. 54 at the Northern Transportation Company camp where the Great Bear River leaves Great Bear Lake. It is on a beach 37 feet above Great Bear Lake, which at present cannot be dated geologically. However, carbon or bone from archæological excavations may eventually date the site. It has been suggested that this area was not covered by ice during the final stages of the Pleistocene,[2] which may have some relevance to the problem of dating the site. The only evidence at present for the dating of the site is a single piece of mammoth or mastodon tusk in the same stratum as the artifacts. However, this single object is not conclusive evidence and might just as well be the result of aboriginal curio collecting as the result of food collecting. Typologically, however, the artifacts from the site lead me to suspect that it may be very early. The two large projectile points are very suggestive of Plainview points which, in many places, have been found in association with extinct animals (including the mammoth).[3] These types of points have been found in Alaska in the interior,[4] and on the coast near Bering Strait.[5] I have seen similar ones from sites near Peace River town in Alberta, and Krieger has listed numerous examples from sites in the Great Plains as far south as Texas.[6] The other types of artifacts found at N.W.T. 54 associated with these points have been found with Plainview points at most of the few other sites dug that have Plainview points associated with an artifact assemblage, such as the Fort 41, Fort 42, and Medicine Creek sites in Nebraska, the Long Site in South Dakota, and the Brohm Site in Ontario. Until excavation of N.W.T. 54 has been completed and the total artifact assemblage found, I shall not attempt to make any site comparisons or draw wider conclusions. However, the present data are suggestive of a series of sites from Alaska to Great Bear Lake to Peace River to the Great Plains of the United States that may be genetically

---

[1] *See* note 2, p. 32.
[2] Porsild, A. E. A biological exploration of Banks and Victoria Islands. Annual Report, National Museum of Canada for the Fiscal Year 1949-50. Bulletin 123, pp. 133-134. Ottawa, 1951.
[3] Krieger, A. Artifacts from the Plainview Bison Bed. (*In* Sellards, Evans and Meade: Fossil Bison and Associated Artifacts from Plainsview, Texas.) Bulletin Geological Society of America, vol. 28, p. 951. 1947.
[4] Rainey, see note 2, p. 19, see Fig. 10, No. 4.
[5] Hibben, F. C. Evidence of Early Man in Alaska. American Antiquity, vol. 8, plate XV-6. 1943.
[6] Krieger. Op. cit.

connected. If they are, and the dates of each site are determined, then I believe it may be possible to outline one of the early migrations from Alaska to Texas via the Mackenzie River drainage system. Certainly we seem to have more than a good hint that such a migration might have taken place. The relationship of this "Plainview Complex" to other Early Man assemblages and other definite conclusions must await further data from excavated sites.

In conclusion, the survey of the Mackenzie drainage has produced some suggestive hints concerning the migration of people and diffusion of culture from Asia to America. It is now necessary to transform these hints into solid archæological facts by excavation.

BIBLIOGRAPHY

Giddings, Jr., J. L. The Denbigh flint complex. Amer. Antiquity, Vol. XVI, No. 3, pp. 193-203. Menasha, Wisc. 1951.

Hibben, F. C. Evidence of Early Man in Alaska. Amer. Antiquity, Vol. 8, 1943. Plate XV-6. 1943.

Johnson, Frederick. An archæological survey along the Alaska Highway, 1944. Amer. Antiquity, Vol. 11, No. 3, pp. 183-186. Menasha, Wisc. 1946.

Krieger, A. Artifacts from the Plainview Bison Bed. (*In* Sellards, Evans and Meade: Fossil Bison and Associated Artifacts from Plainsview, Texas.) Bull. Geol. Soc. of America, 1947, Vol. 28, p. 951. 1947.

MacNeish, Richard S. An archæological reconnaissance in the Northwest Territories. Annual Report, National Museum of Canada for the Fiscal Year, 1949-50. Bull. No. 123, pp. 24-41. 1951.

Okladnikov, A. P. The first Neolithic find on the Chuckchi Peninsula. Kratkie Soobscheniya Instituta Istorii Material'noy Kul'-tury Imeni N. Ya. Marra, vvp. 31, pp. 196-8. 1950.

Porsild, A. E. A biological exploration of Banks and Victoria Islands. Annual Report, National Museum of Canada for the Fiscal Year, 1949-50, Bull. No. 123, pp. 133-134. 1951.

Rainey, Froelich G. Archæology in Central Alaska. Anthropological Papers, Amer. Mus. of Nat. Hist., Vol. 36, Pt. 4, pp. 381-399. New York, N.Y. 1939.

Skarland, Ivar and J. L. Giddings, Jr. Flint stations in Central Alaska. Amer. Antiquity, Vol. XIV, No. 2, p. 116. Menasha, Wisc. 1948.

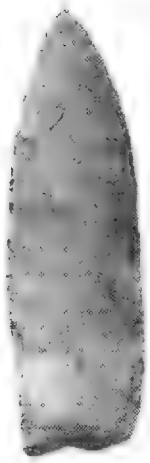
Solecki, Ralph S. Archæology and geology in northwestern Alaska. Earth Science Digest, Vol. 9, Pt. 7, pp. 3-7. Revere, Mass. 1950.

PLATE II

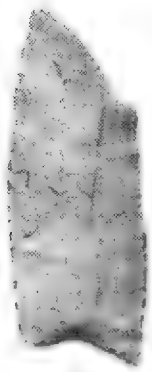
($\frac{1}{2}$ natural size)

Artifacts from Site N.W.T. 54.

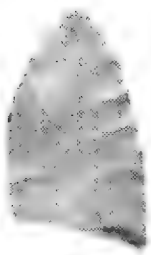
Figure 1. Projectile point on loan from A Davidson, Rutland, Sask.
Figure 2. Base of projectile point from surface. Cat. No. N.M.C., XI-C-175a.
Figure 3. Tip of projectile point from grey sands. Cat. No. N.M.C., XI-C-175b.
Figure 4. Small quartzite projectile point from surface. Cat. No. N.M.C., XI-C-176.
Figure 5. Snub-nosed end scraper. Gift of A. Davidson, Rutland, Sask. Cat. No. N.M.C., XI-C-177.
Figure 6. Flake side scraper from grey sands. Cat. No. N.M.C., XI-C-178.
Figure 7. Chopper from surface. Cat. No. N.M.C., XI-C-180.
Figure 8. Ovoid blade. Gift from Felix Casone. Cat. No. N.M.C., XI-C-179a.
Figure 9. Base of ovoid blade from grey sands. Cat. No. N.M.C., XI-C-179b.
Figure 10. Fragment of mammoth or mastodon tusk from grey sands. Cat. No., N.M.C. XI-C-181.



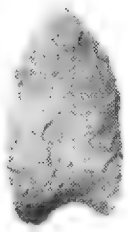
1



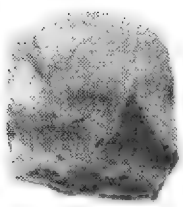
2



3

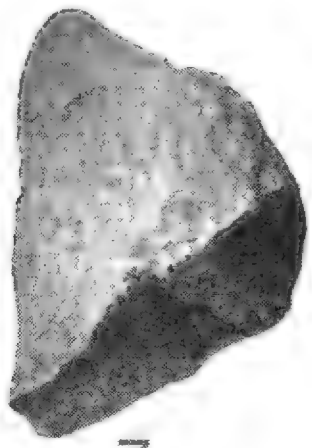


4

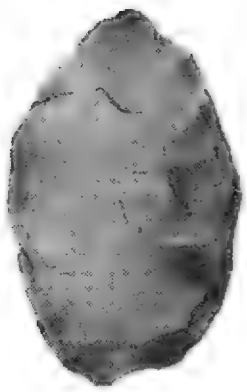


5

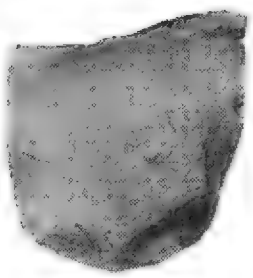
6



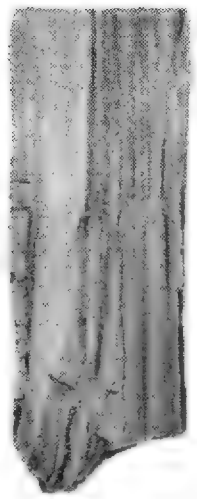
7



8



9



10

64201—4

Plate III

($\frac{1}{2}$ natural size)

Figure 1. Obsidian lamellar flake with re-touched ovoid ends. From Site N.W.T. 42. Cat. No. N.M.C., XI-C-136a.

Figure 2. Chert lamellar flake with re-touched ovoid ends. From Site N.W.T. 42. Cat. No. N.M.C., XI-C-137b.

Figure 3. Chert lamellar flake with re-touched ovoid ends. From Site N.W.T. 42. Cat. No. N.M.C., XI-C-137c.

Figure 4. Micro-burin. From Site N.W.T. 42. Cat. No. N.M.C., XI-C-138a.

Figure 5. End scraper. From Site N.W.T. 42. Cat. No. N.M.C., XI-C-139a.

Figure 6. Fragment of an ovoid blade. From Site N.W.T. 42. Cat. No. N.M.C., XI-C-141.

Figure 7. Chert lamellar flake with re-touched ovoid ends. From Site N.W.T. 42. Cat. No. N.M.C., XI-C-137a.

Figure 8. Obsidian lamellar flake with re-touched ovoid end from Site N.W.T. 42. Cat. No. N.M.C., XI-C-136b.

Figure 9. Micro-burin from a prismatic flake. From Site N.W.T. 42. Cat. No. N.M.C., XI-C-138b.

Figure 10. End scraper. From Site N.W.T. 42. Cat. No. N.M.C., XI-C-139b.

Figure 11. Flake side scraper. From Site N.W.T. 42. Cat. No. N.M.C., XI-C-140a.

Figure 12. Leaf-shaped point. From Site N.W.T. 42. Cat. No. N.M.C., XI-C-143.

Figure 13. Side-notched projectile point. From Site N.W.T. 62. Found by Dr. C. O. Hage. Cat. No. N.M.C., XI-C-9.

Figure 14. Pentagonal point. From Site N.W.T. 53. Cat. No. N.M.C., XI-C-168.

Figure 15. End scraper. From Site N.W.T. 53. Cat. No. N.M.C., XI-C-169a.

Figure 16. End scraper. From Site N.W.T. 53. Cat. No. N.M.C., XI-C-169b.

Figure 17. End scraper. From Site N.W.T. 53. Cat. No. N.M.C., XI-C-169c.

Figure 18. Side-notched point. From Site N.W.T. 47. Cat. No. N.M.C., XI-C-154b.

Figure 19. Side-notched point. From Site N.W.T. 47. Cat. No. N.M.C., XI-C-154c.

Figure 20. Side-notched point. From Site N.W.T. 47. Cat. No. N.M.C., XI-C-154d.

Figure 21. End scraper. From Site N.W.T. 47. Cat. No. N.M.C., XI-C-155a.

Figure 22. End scraper. From Site N.W.T. 47. Cat. No. N.M.C., XI-C-155b.

Figure 23. Flake side scraper. From Site N.W.T. 47. Cat. No. N.M.C., XI-C-156a.

Figure 24. Ovoid blade. From Site N.W.T. 47. Cat. No. N.M.C., XI-C-157a.

Figure 25. Large flake scraper. From Site N.W.T. 56. Cat. No. N.M.C., XI-C-186.

Figure 26. Large leaf-shaped blade. From N.W.T. 51. Cat. No. N.M.C., XI-C-165.

PLATE III

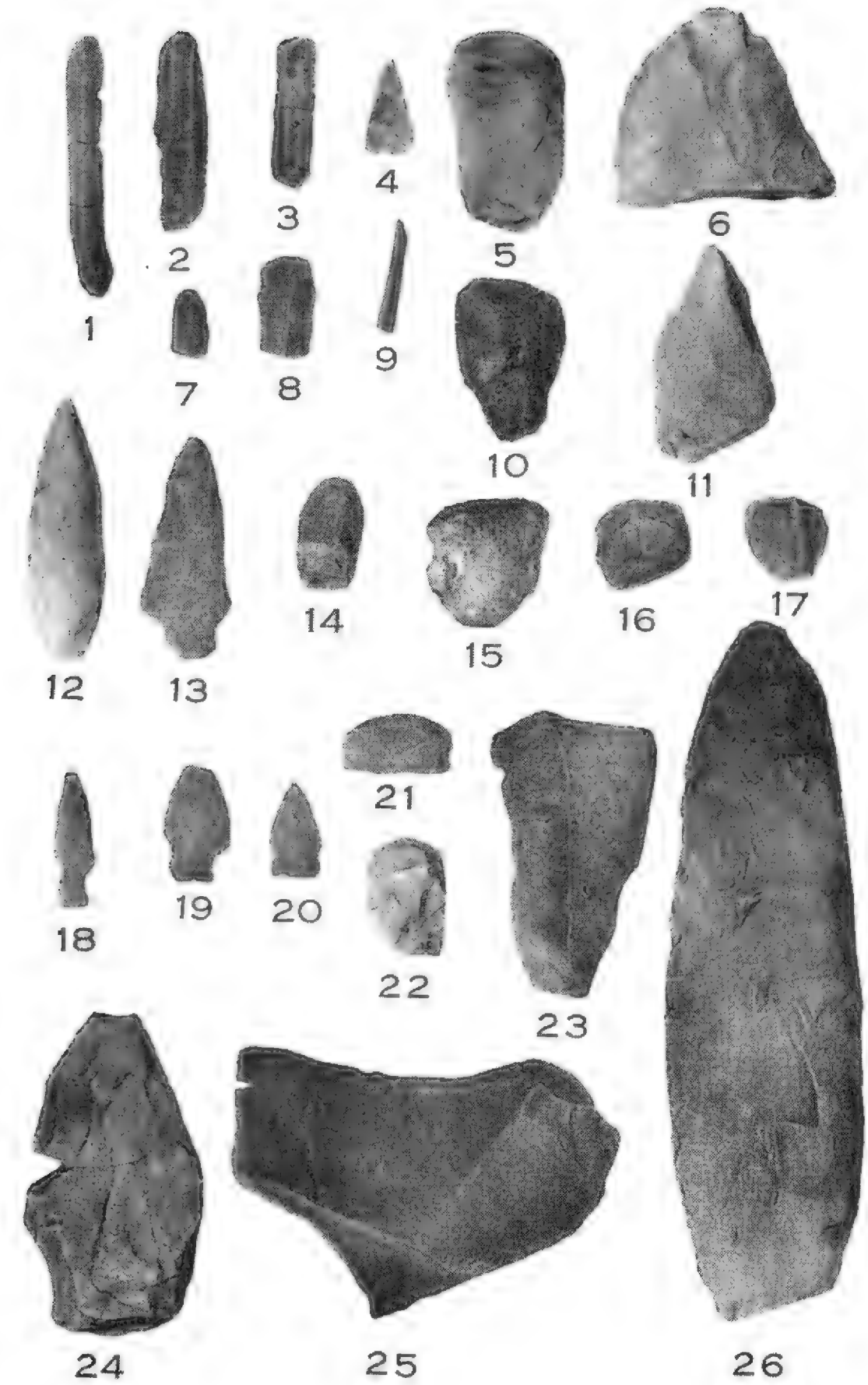


PLATE IV

(½ natural size)

Figure 1. Bone netting needle. From Site N.W.T. 58. Cat. No. Nat. N.M.C., XI-C-191.

Figure 2. Bone beamer. From Site N.W.T. 59. Cat. No. N.M.C., XI-C-208.

Figure 3. Bone fish spear. From Site N.W.T. 5. Cat. No. N.M.C., XI-C-133.

Figure 4. Bone bird stunning point with a pointed base. From N.W.T. 59. Given by Neil Roberts of Fort McPherson. Cat. No. N.M.C., XI-C-199.

Figure 5. Bone bird stunning point with bifurcated base. From Site N.W.T. 59. Given by Willie MacDonald of Fort McPherson. Cat. No. N.M.C., XI-C-200.

Figure 6. Bone bird stunning point with hollow base. From Site N.W.T. 59. Cat. No. N.M.C., XI-C-198.

Figure 7. Long bone pin with a notched base. From Site N.W.T. 58. Cat. No. N.M.C., XI-C-195a.

Figure 8. Long bone pin with a notched base. From Site N.W.T. 58. Cat. No. N.M.C., XI-C-195b.

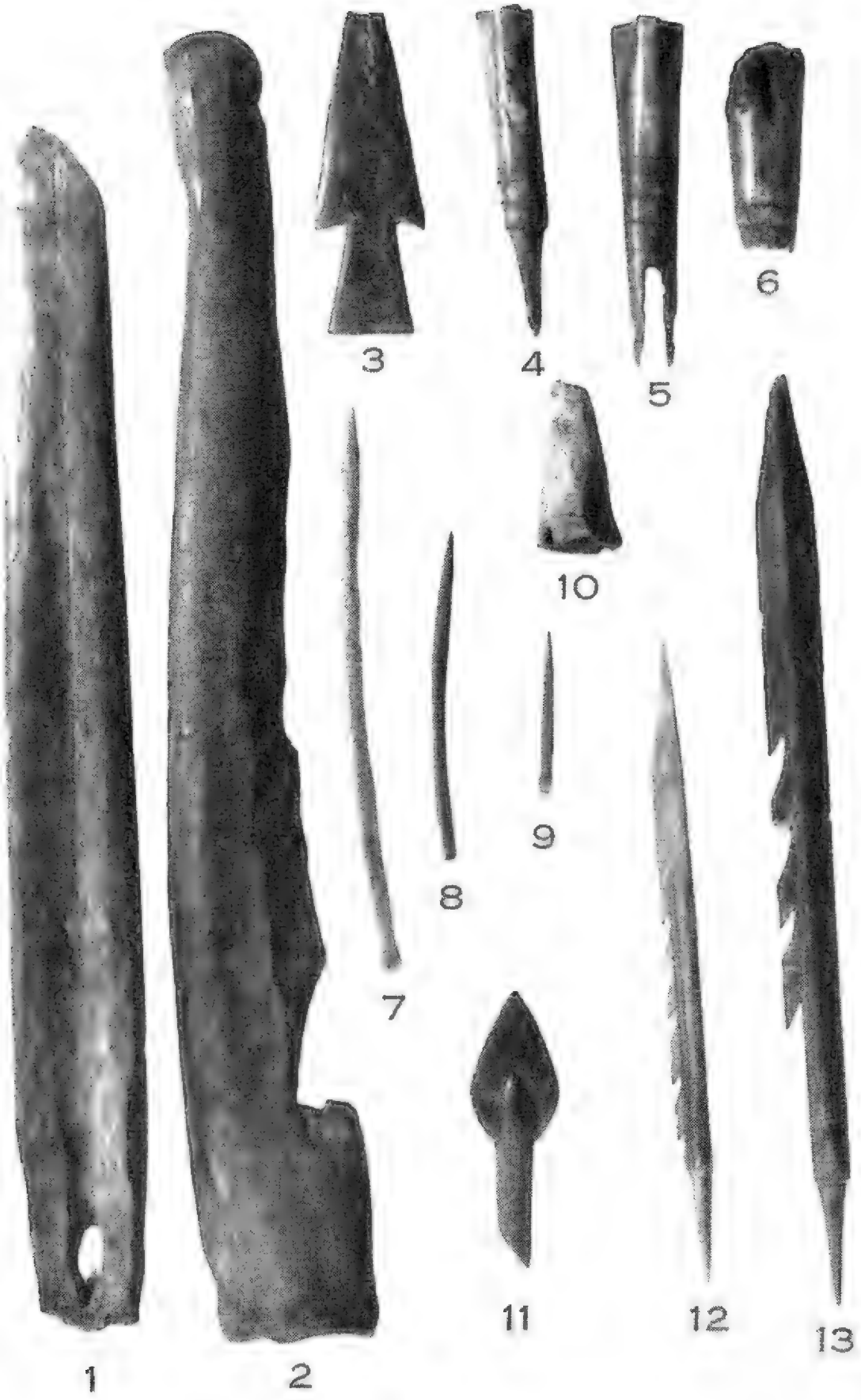
Figure 9. Bone pin with notched base. From Site N.W.T. 59. Cat. No. N.M.C., XI-C-203.

Figure 10. Ground deer or caribou phalanx (for cup-and-pin game). From Site N.W.T. 59. Cat. No. N.M.C., XI-C-202.

Figure 11. Brass arrowhead with bone shaft. From Site N.W.T. 59. Cat. No. N.M.C., XI-C-201.

Figure 12. Bone multi-barbed unilateral harpoon head. From Site N.W.T. 59. Cat. No. N.M.C., XI-C-204.

Figure 13. Multi-barbed unilateral bone harpoon head. From Site N.W.T. 61. Cat. No. N.M.C., XI-C-214.


1
2
3
4
5
6
7
8
9
10
11
12
13

EXCAVATION OF A CAPE DORSET ESKIMO HOUSE SITE, MILL ISLAND, WEST HUDSON STRAIT

By Deric O'Bryan

ACKNOWLEDGMENTS

The Arctic Institute of North America, under contractual arrangements with the United States Office of Naval Research, supported an expedition by the writer to Mill Island in the summer of 1951. The United States and Royal Canadian Air Forces provided transportation, and the Office of the Commissioner, Northwest Territories, Canada, supplied the necessary permits. The Hudson's Bay Company arranged for travel between Mill and Southampton Islands; the Post Managers at Southampton and Cape Dorset furnished generous help and hospitality. Particular thanks for encouragement, assistance, and advice are due Colonel Wilfred J. Paul and Dr. Paul H. Nesbitt, Air University, United States Air Force; Dr. F. J. Alcock, Chief Curator, National Museum of Canada; Colonel Graham Rowley, member of the Defence Research Board of Canada; and Dr. Henry B. Collins, Jr., Smithsonian Institution.

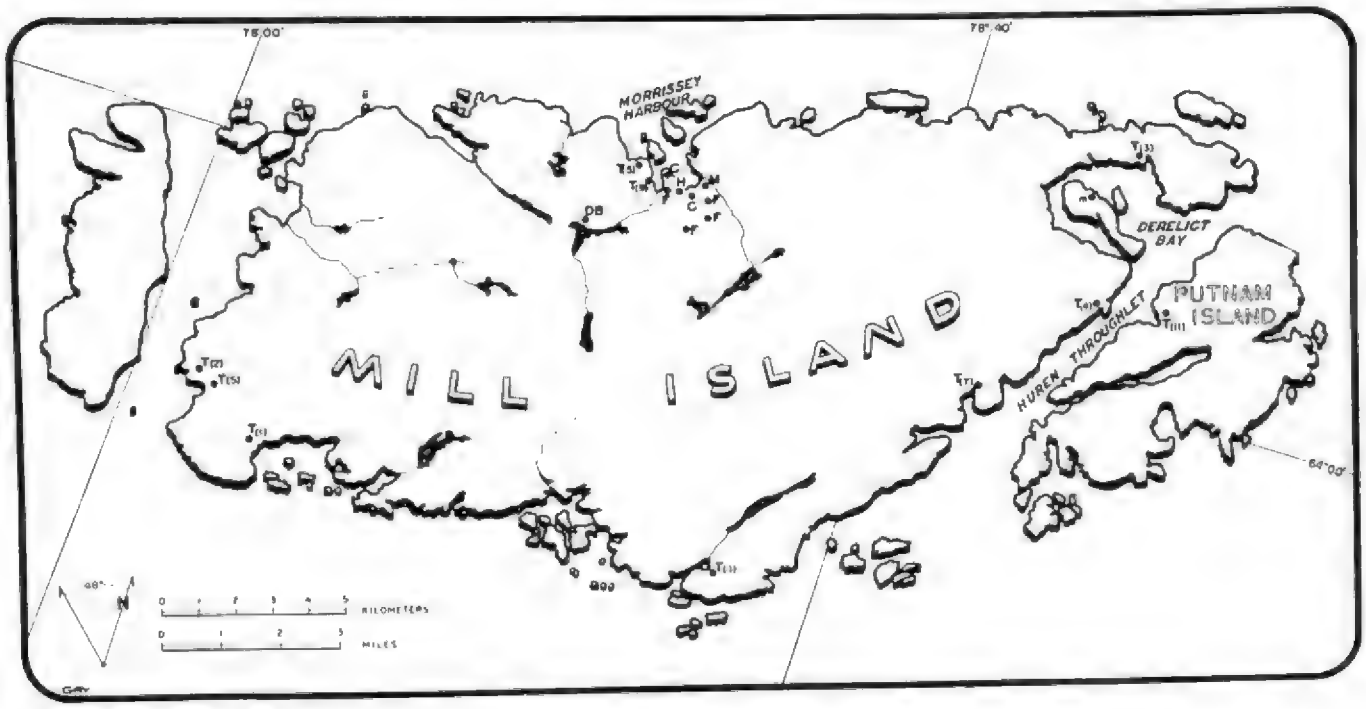


Figure 2. Sketch map of Mill Island.

T—are camp-sites, marked by rings of loose stones used to secure tents. Figure in parenthesis denotes the number of tent rings in the site. H—is the Dorset Eskimo dwelling (Morrissey Harbour, centre of north coast). F—are fox traps: roofed enclosures of stone having a single entrance easily blocked by a balanced rock. C—are cairns: rock columns on a high promontory, usually near an Eskimo dwelling or camp-site. DB—is a caribou drive and hunter's blind, southwest of Morrissey Harbour. The "drive" comprised eight piles of rock, barring passage between a lake edge and a low cliff. The "blind" was a low curved wall of up-ended boulders. M—our camp in Morrissey Harbour. m—a recent Eskimo camp-site on an island in Derelict Bay, northeastern Mill Island.

HISTORY

Mill Island was sighted and named by Bylot in 1615 and partially explored by Luke Foxe in 1621 (1). It was revisited in 1927 by the Putnam-Bartlett Baffin Island Expedition (2); members of the expedition circumnavigated the island; and three of them secured a small collection of artifacts from an Eskimo ruin.

The specimens are characteristic of the Cape Dorset Eskimo culture, which had been identified in 1925 (3). They were deposited in the Museum of the American Indian, New York (4).

A large number of Cape Dorset Eskimo remains have been found throughout the eastern Canadian Arctic, in Greenland, and in Newfoundland. However, as recently as 1950 no Cape Dorset house site had been reported other than the Mill Island "tunit" ruin.

ITINERARY

On July 2, the writer left Montgomery, Alabama, accompanied by Mr. Daniel von H. Rogers as assistant. A United States Air Force plane was taken to Ottawa, and Coral Harbour, Southampton Island, was reached on July 11 by Royal Canadian Air Force scheduled flight via Winnipeg and Churchill. An Eskimo motor boat was used to reach Mill Island on July 17. Skipper John Ell's son, Ben, stayed as a member of the party.

Work was carried out from a base camp in Morrissey Harbour until September 1. With a skiff and an outboard motor, it was possible to make an archæological survey of all coasts. A visit to neighbouring Salisbury Island lasted a week in mid-August, and a number of Eskimo camp-sites and two groups of winter dwellings were found on the north-west end of that island.

The summer of 1951 was unusually cold in the West Hudson Strait area. The break-up of pack ice was slow; its normal movement to the Atlantic was delayed. The belated appearance of the large ice floe from Foxe Basin necessitated a change in the arrangements which had been made to have the party return to Southampton Island. Skipper John Ell unsuccessfully tried to make contact for five days. Later, as there was no improvement in ice conditions, Mr. Bert Swaffield at Southampton sent a radio message to Mr. Bob Griffith at Cape Dorset. On September 1, Mr. Griffith manœuvred his motorboat into Morrissey Harbour and took the party to Baffin Island. The Hudson's Bay Company's supply ship, the *Rupertsland,* arrived on September 9; delayed by ice and very rough weather, she reached Churchill on September 15. A Canadian Air Force plane flew the writer and Mr. Rogers to Montreal on September 20; a United States Air Force plane returned them to Montgomery on September 26.

ARCHÆOLOGICAL SURVEY

Mill Island, flanked by islets, is about twenty-one miles long from east to west and eight miles wide from north to south. Few of its bare, granite hills exceed 500 feet in elevation. All likely promontories and beaches were visited in the search for Eskimo remains, and several trips were made into the centre of the island. The map shows the positions of Eskimo camp-sites, the ruined dwelling, cairns, fox traps, and a caribou run and hunter's blind in the interior. One modern camp-site on an island in Derelict Bay was found in the northeastern corner of Mill Island. The bones of several seal were strewn around two stone hearths; a fairly fresh strip of blubber still remained in a convenient cleft in a nearby ledge. It was learned later that an Eskimo hunter had been marooned on the island in the early '40's. He had wrecked his kayak and the group he was with had given him up for lost and returned to Baffin Island. In the course of two years on the island the derelict hunter killed a number of seals, built a raft of the inflated skins, and then paddled north to Baffin Island and his people.

EXCAVATION

The Cape Dorset site is in a lobe of Morrissey Harbour, on the north side of Mill Island, approximately sixty feet above the beach level (Plate VA). It is hidden from the Strait, and from most of the harbour, by a low granite ridge, which separates the dwelling and middens from a cluster of stone caches near what was presumably the landing area. The ruin was isolated; the nearest tent rings are on the western edge of Morrissey Harbour. The house had a southern exposure, was well protected from winds, and was one of the warmest places on the island.

Excavation of the dwelling interior involved little more than stripping away the accumulation of moss and lichen (Plate VI, A and B). Refuse on the floors varied in depth from nothing (exposed stone flagging) to 8 inches (at the base of the walls). The entrance passageways and the floor compartments had slightly deeper accumulations of muck, ice lenses, and frozen soil. There was no evidence of re-occupation. The maximum depth of debris in the middens was 26 inches. The outside areas to the south of the two entrance passages had been used for stone knapping; they were sprinkled with chips, cores, and rejects.

The dwelling consisted of two rooms, each having an entrance passage to the east, and connected by a storage area. Each room had a single bed platform at the back, opposite the entrance. The south room was flagged, with a bed platform of slabs (Plate VI B); in the north room, the platform was of earth, outlined by rocks, and flagstones had been placed only around the entrance passage opening (Plate VI A). Two interesting details are not shown in the illustrations. First, very little debris was found inside the dwellings. There was but little difference between the debris found inside the house and in the middens; a matting of lichens and mosses covered everything but a few exposed rocks; the underlying layer of organic-stained sand contained food bones and rejects and artifacts both

inside and outside the dwellings; no knapping area was found inside the houses. Apparently it had been roofed with skins supported by drift logs and whale ribs; no whale bones were used in wall construction nor were any found in the middens, but many were noticed high on beaches, along with some drift wood. Second, each room had a slender shaft of granite embedded in the southeast corner; these supported thin rock slabs which roofed very low storage compartments.

The great accumulation of food bones was in the middens. Remains of seal and walrus predominated, but the number of fox bones was surprisingly large. Bones of the arctic hare were present, but scarce; the party saw none of these animals during its stay. Remains of at least two narwhal and nine polar bear were noted. Bird bones included those of geese, duck, and ptarmigan. A single vertebra of a small fish was found in the south room of the dwelling; several little char were caught in a nearby stream. The middens contained conclusive evidence that Mill Island once supported a herd of caribou; 117 cannon bones were found in the site, and a hunting area was located in the interior of the island. No caribou exist there today, nor were any remains found in the later camp-sites. None of the bones showed marks of gnawing; the occupants of the site apparently did not have dogs.

ARTIFACTS

Specimens were equally distributed throughout the dwelling and refuse areas. No specimens found inside the house were under the floor level except a few artifacts which were in the storage bins with openings at the level of the floor, and a few small things which had fallen into cracks in the flagging stones. There was no sign that the site had been used before or after its occupation by the Eskimo who built the two adjoining houses. Approximately 400 complete or fragmentary artifacts were collected; they comprise one of the best and most representative collections from Cape Dorset Eskimo. The site was isolated and occupied only once, thereby assuring a pure collection. Only five specimens (barely over one per cent) are open to question. These are two ulu handles of ivory, two toy harpoon heads (Plate (VII, g and h), one of bone and one of ivory, and one large knife handle of bone. These five specimens all contain perforations or sockets which appear to have been reamed or drilled. Approximately 115 specimens were found inside the houses; these include one ivory ulu handle in which holes had been drilled, the two miniature harpoon heads illustrated in Plate VII, g and h, one slate knife blade (in the Heye Foundation collection) in which a drilled hole had been started; and one head of an ivory skewer or trimmer which contained both drilled and gouged holes. The two throwing boards were found inside the house. Fully one hundred specimens are unquestionably Dorset. The middens yielded a second drilled ulu handle, a Thule type knife handle, and a harpoon socket unquestionably Dorset but containing drilled peg holes. The few Thule artifacts were scattered throughout the refuse and—mixed with true Dorset artifacts in platform compartments, etc.—undoubtedly were contemporaneous with the Dorset materials.

Harpoon heads are of ivory or bone. Not many were found, and most were fragmentary. All have closed rectangular sockets, except the two toys. The commonest type (Plate (VII, e) is believed to be the latest of the Cape Dorset varieties (5). Other types represented are shown in Plate VII, d and f. No other examples of Cape Dorset harpoon heads were found, nor harpoon heads characteristic of other Eskimo horizons, with the exception of the two miniatures mentioned above.

Harpoon foreshafts are all of ivory and have one (rarely two) gouged holes for line attachment. Plate VII, a, illustrates the largest foreshaft.

Barbed lance heads of antler or ivory are typically Cape Dorset. Some were detachable, perforated for line attachment (Plate VII, b). Others had bases roughened to secure lashings (Plate VII, c).

A single harpoon socket of bone was found. It had the broken base-end of a foreshaft embedded in the wedge-shaped slot. A lateral eyelet had been gouged for attachment of a harpoon foreshaft line. Holes for peg fasteners to the harpoon shaft appear to have been drilled. This would be a questionable specimen if it were not for the gouged line-hole and association with a foreshaft having the Cape Dorset type of tanged base.

Knife handles of ivory and bone were plentiful. Some had been shaped to permit the attachment of component parts to secure the blades by binding (Plate VIII, a and b). Many had a gouged perforation in the handle for thong attachment (Plate VIII, d). Most blade slots accommodate chert and crystal chips, or the asymmetrical chipped knives so common in the collection (Plate VIII, c, and Plate XI, f and g). One handle had three slots in line, for multiple stone insets.

Scraper handles of ivory or wood had concave ends, grooved for lashing stone blades in place (Plate VIII, f). One handle was composed of two long pieces of ivory which had been bound together.

Adze sockets are represented by two socketed specimens of antler (Plate VIII, g). Several bits of ground slate and nephrite may have been used in these sockets.

Flakers of antler and bone are well represented. Some of the antler specimens have been shaped to fit the hand (Plate VIII, i); one bone specimen was roughened to prevent slipping.

Scrapers of caribou leg bone (Plate VIII, h) and ivory are represented by five specimens.

Sledge shoes, all ivory, are characterized by interlocking-V attachments and gouged holes for lashings (Plate IX, a and b).

Needles of ivory or bone are illustrated in Plate X, a and b. One cache of five bone needles had been placed under a small slab in the bed platform of the south room. No needle cases were found.

Snow knives of antler are represented by three complete specimens (Plate IX, c). Except for their small size, they are similar to those made and used by later Eskimo.

Spatulate implements of ivory, common in most collections of Cape Dorset specimens, are poorly represented in the Mill Island material (Plate X, c).

Toys are quite numerous, although not so varied and well represented as in the Abvadjar collection reported by Rowley (6). The toy harpoon heads have been mentioned above; two other miniatures of the commonest harpoon-head type (Plate VII, e) are of ivory. Other specimens, ivory or antler, include a bear-headed bird, and a bird which looks like a raven (several ravens were seen), shown in Plate X, f and g; a flensed seal, and a walrus skeleton. An ivory pendant (Plate X, d) and a single small round bead of ivory (Plate X, e) were found between flagstones in the south room.

Half the specimens are stone implements. Commonest are chipped asymmetrical knife blades (Plate VIII, c, and Plate XI, f and g), snub-nosed scrapers (Plate VIII, e, and Plate XI, e), and projectile points Plate XI, h to l). A number of lamellar flakes of crystal and chert apparently were used as knife blades (Plate XI, a and b); some were shaped for use as points (Plate XI, j). Crystal knives were fairly common; usually the base of the crystal was shaped and faceted points show some evidence of use as reamers or burins (Plate XI, d).

Ground slate implements include projectile points (Plate XI, n), adze blades (Plate XI, o), and knives (Plate XI, m). Several whetstones of slate or mudstone were well worn (Plate XI, p). Burin-like implements, or "boot creasers," are of chert, chalcedony, and nephrite (Plate XI, c); the largest example of chalcedony was found in 1927 and is now in the Museum of the American Indian in New York. Two thin slabs of nephrite are similar to the adze illustrated by Collins (7) but appear too fragile to have served as adze blades; they may have been fleshers or leather softeners.

Wooden implements include two throwing boards (Plate IX, f). The smaller is either a miniature or a sling handle. A slender rod looks like a fire drill, but no hearth was found. A thin shaft, with a chip inserted in one end, may have served as a drill or an arrow shaft. However, no fragments or other evidence from the collection suggest the presence of the bow.

SUMMARY

The Eskimo site on Mill Island appears to have been built and occupied by two families. Apparently they were attracted to Mill Island by numerous seal and walrus which continue to frequent the coasts. There they found a herd of caribou and remained until the herd was exterminated. The accumulations in the middens imply that they lived there three or four years.

The dwelling was occupied only once; probably continuously, as debris was not stratified by plant growth, nor by recognizably weathered surfaces. The site was well hidden, possibly with intention, perhaps to benefit from a protected southern exposure.

It is a Cape Dorset Eskimo ruin. The house construction and arrangement differ from those associated with the Thule Eskimo culture. Almost 99 per cent of the artifacts are representative of characteristic Cape Dorset types or, if heretofore unreported, of obvious Cape Dorset manufacture. The five conspicuously aberrant specimens either show a combination of Cape Dorset and Thule techniques or are Thule; the Cape Dorset families may have had some contact with Thule pioneers in West Hudson Strait or encountered a Thule Eskimo camp-site. Probably the Mill Island ruin was left by late Cape Dorset people, soon after the first Thule culture bearers entered the region, approximately 1,000 to 1,500 years ago.

BIBLIOGRAPHY

(1) The voyages of Captain Luke Foxe, of Hull, and Captain Thomas James, of Bristol, in search of a North-West Passage, in 1631-32. Hakluyt Society Publications, Series 1, vols. 88-89. London. 1894.

(2) Putnam, G. P. The Putnam Baffin Island Expedition. The Geographical Review, vol. XVIII, No. 1, pp. 9-12, 28-29. The American Geographical Society, New York. 1928.

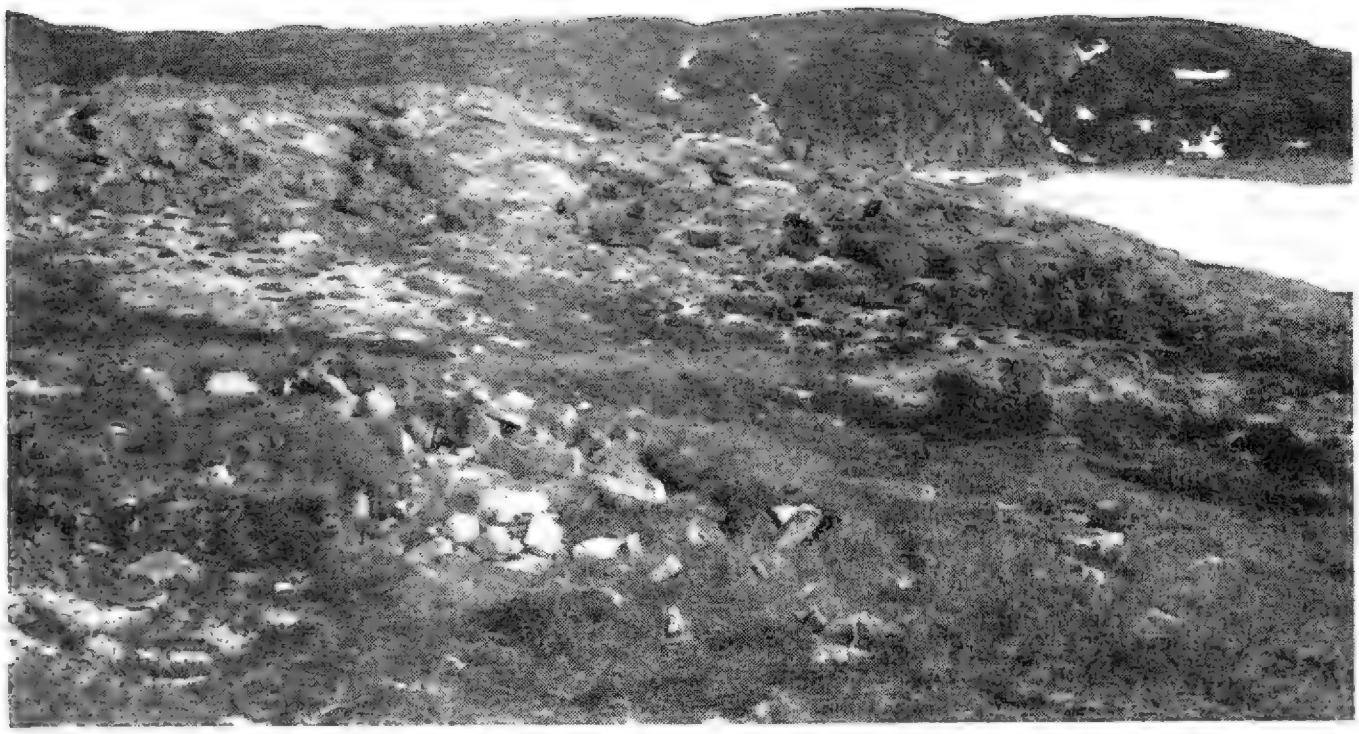
(3) Jenness, Diamond. A new Eskimo culture in Hudson Bay. The Geographical Review, vol. XV, No. 3, pp. 428-437. The American Geographical Society, New York. 1925.

(4) Cadzow, D. A. Archæological work with the Putnam Baffin Island Expedition. Indian Notes, vol. V, No. 1, p. 106. Museum of the American Indian, New York. 1928.

(5) Collins, H. B. Excavations at Frobisher Bay, Baffin Island, Northwest Territories. Annual Report, National Museum of Canada. Bulletin No. 118, p. 21. 1950.

(6) Rowley, Graham. The Dorset culture of the Eastern Arctic. American Anthropologist (new series), vol. XLII, No. 3, figs. 1 and 2 and text p. 495. American Anthropological Association. Menasha, Wisconsin. 1941.

(7) Collins, H. B. Ibid, p. 43, Plate X, No. 21. 1950.

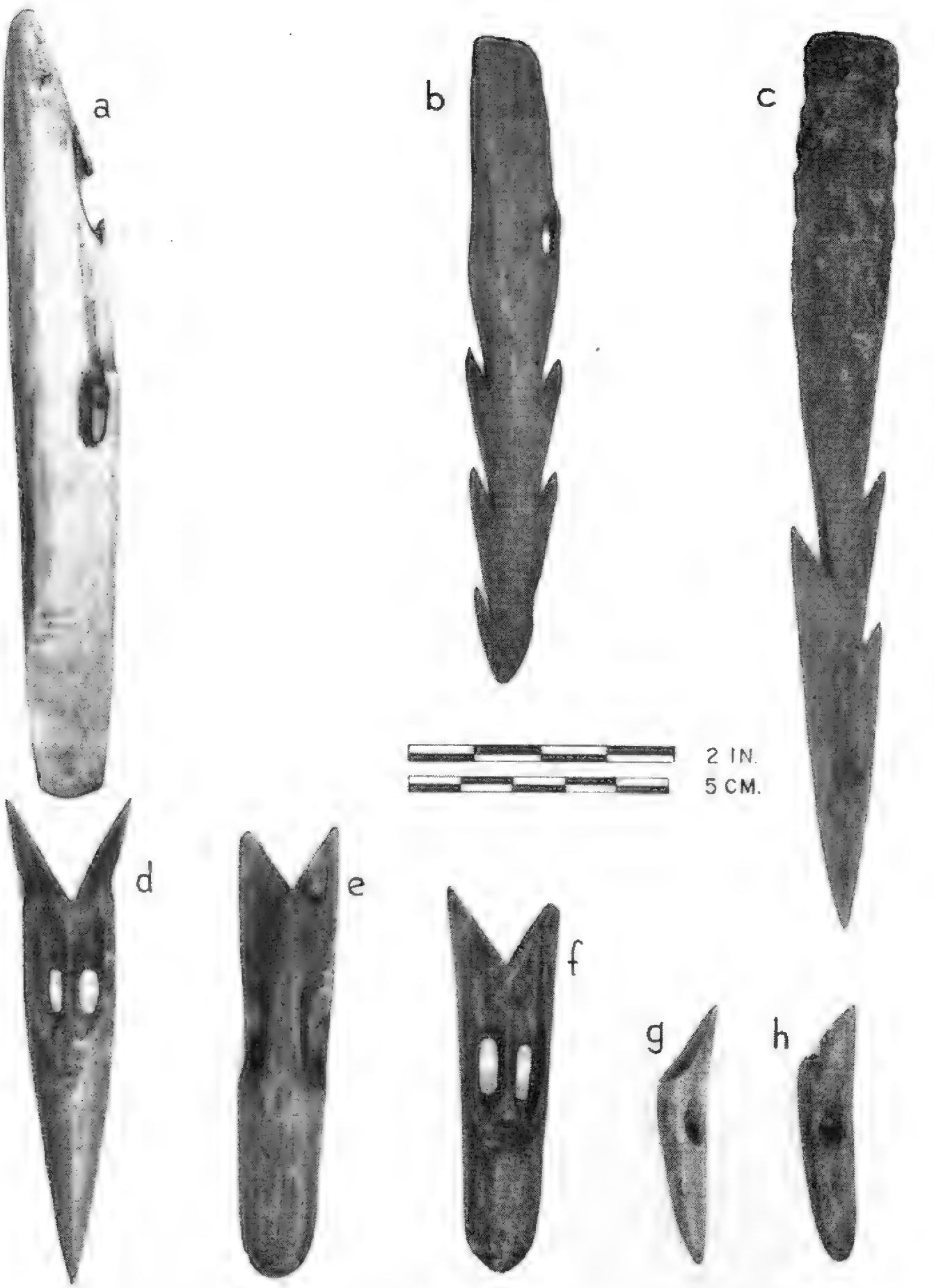


A. Ruin before excavation. Rocks clearly outlined the rooms; the stone lintel was still in place over the entrance to the north room.

B. Ruin after rooms had been cleared. Part of refuse area, at right of picture, has been stripped.

A. North room, looking northwest. Storage bins in foreground. Entrance at right. Bed platform of earth and gravel at left rear. Picture taken from storage alcove between the two rooms.

B. South room, looking west along the entrance passage. Sections of whale ribs over sump in foreground. Flagged floor, and flagged bed platform at rear.



a. Harpoon foreshaft, ivory.
b. Detachable lance head, ivory.
c. Fixed lance head, antler.
d. Harpoon head, ivory.
e. Harpoon head, ivory, with slot for stone blade.
f. Harpoon head, bone, with slot for stone blade.
g. Toy harpoon head, ivory.
h. Toy harpoon head, bone.

PLATE VIII

a. Knife handle, bone.
b. Auxiliary splice to knife handle, bone.
c. Asymmetrical chipped knife, chert.
d. Knife handle, bone.
e. Snub-nosed chipped scraper, chert.
f. Scraper handle, ivory.
g. Adze socket, antler.
h. Pointed scraper, bone.
i. Flaker, antler.

PLATE VIII

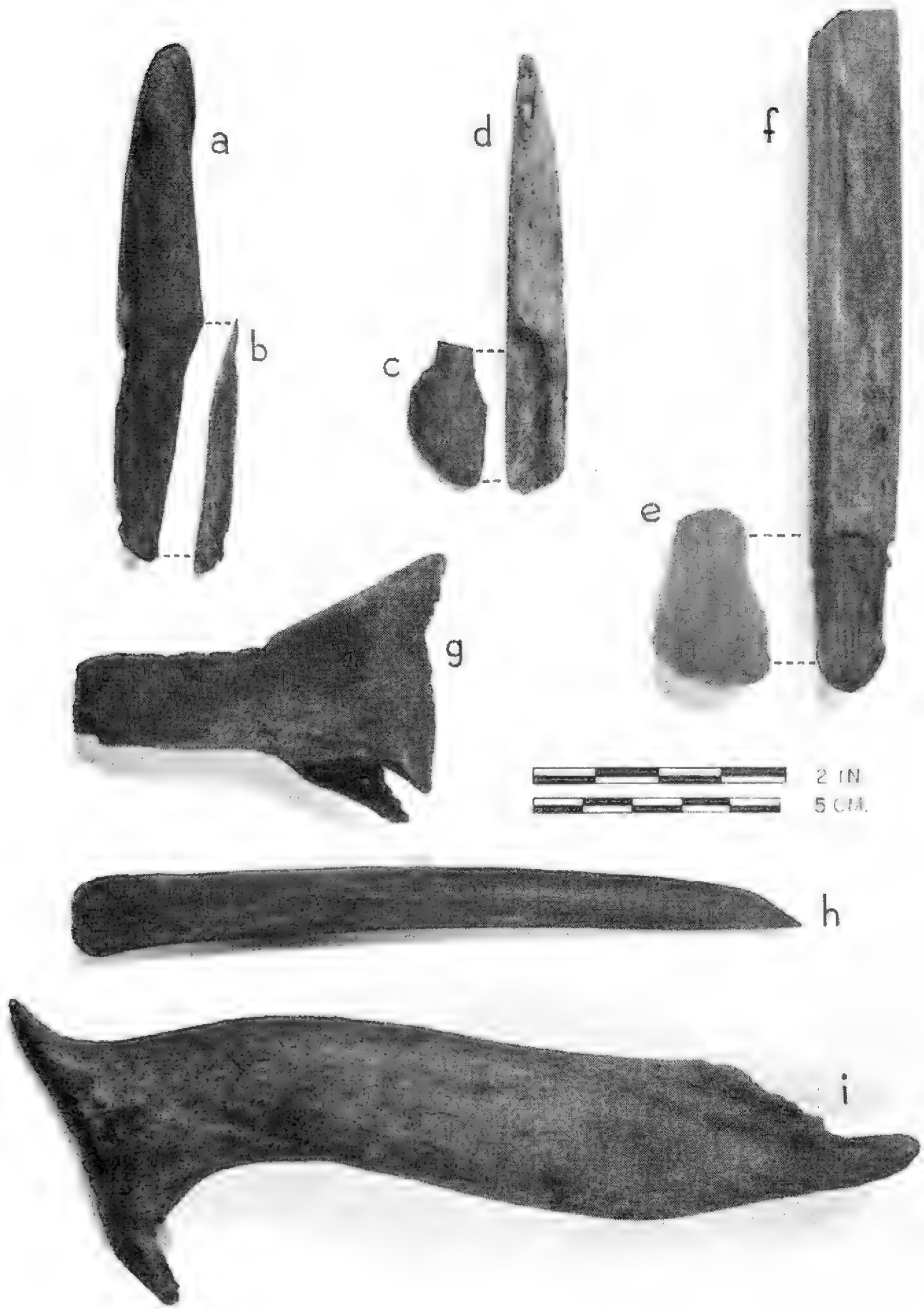


PLATE IX

a. Sledge shoe, ivory, complete specimen.
b. Sledge shoe, ivory.
c. Snow knife, antler.
d. Spoon, antler.
e. Spoon, bone.
f. Throwing board, wood.

PLATE IX

PLATE X

a. Needle, bone.
b. Needle, ivory.
c. Spatulate implement, ivory, with incised marking above gouged hole.
d. Pendant, ivory.
e. Bead, ivory.
f. Bird, antler.
g. Bear-headed bird, ivory.

PLATE X

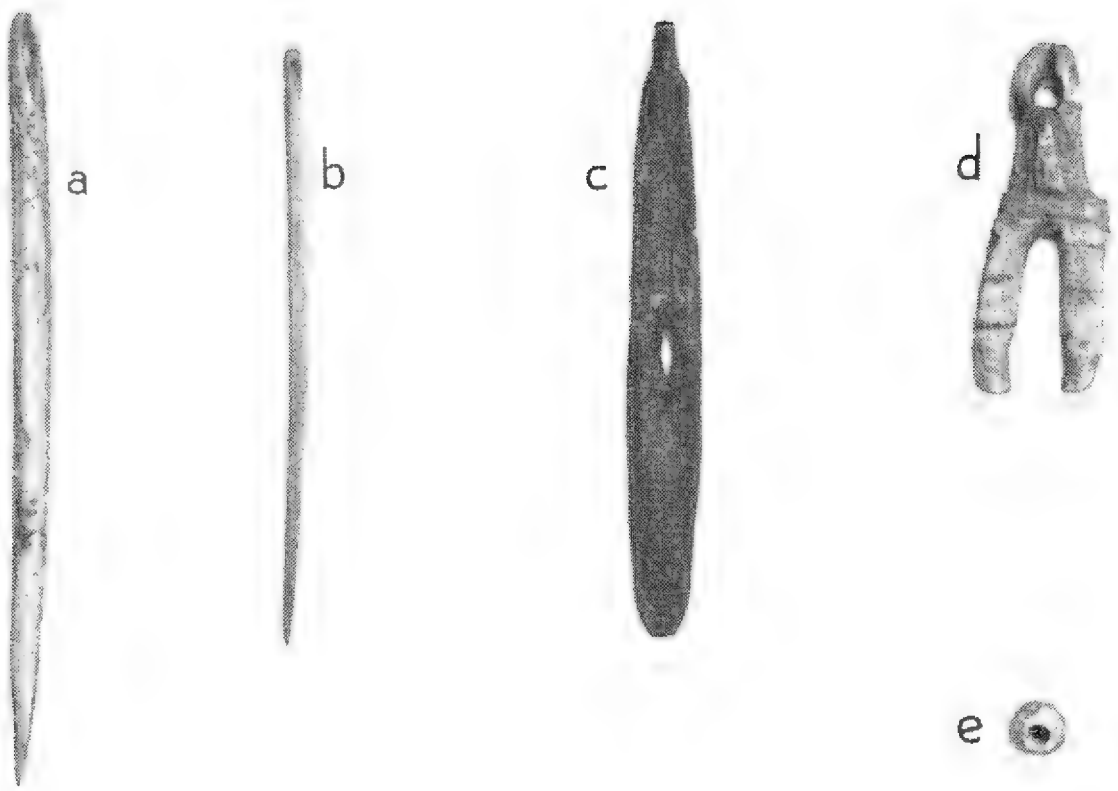
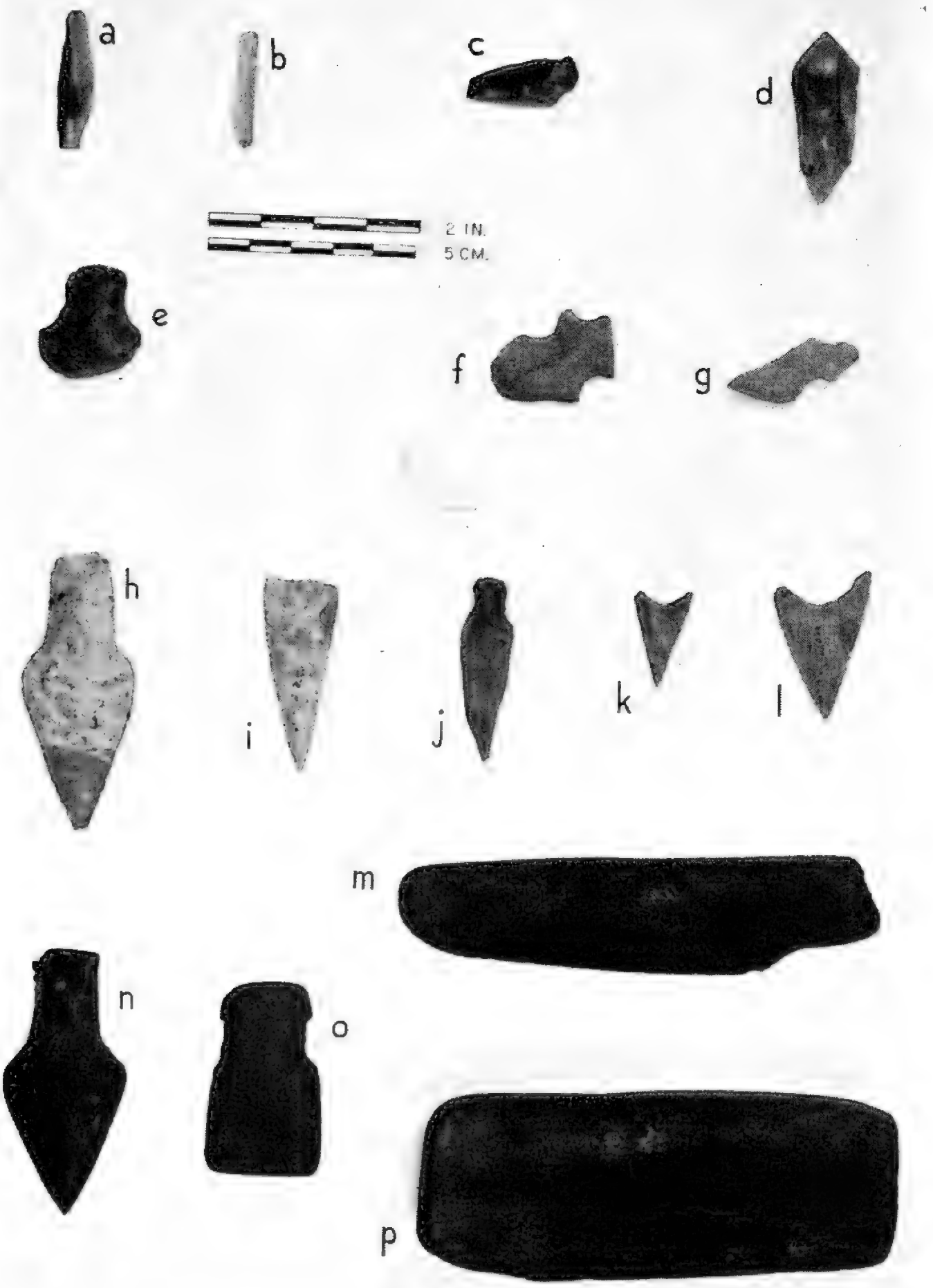


PLATE XI

a. Lamellar flake, chert.
b. Lamellar flake, crystal.
c. Burin-like implement or "boot creaser", nephrite.
d. Chipped knife, crystal.
e. Snub-nosed chipped scraper, chert.
f. Asymmetrical knife, chert.
g. Asymmetrical knife, chert.
h. Chipped projectile point, chert.
i. Chipped projectile point, chalcedony.
j. Lamellar flake, chert, retouched as projectile point.
k. Chipped projectile point, chert.
l. Chipped projectile point, chert.
m. Knife, ground slate.
n. Projectile point, ground slate.
o. Ulo blade, ground slate.
p. Whetstone, slate.

PLATE XI



A PRELIMINARY REPORT ON THE SHEGUIANDAH SITE, MANITOULIN ISLAND

By Thomas E. Lee

In the month of June, 1951, while carrying out an archæological survey of Manitoulin Island, with the assistance of W. D. Bell, an amazing discovery was made near the village of Sheguiandah. There, on both sides of the main highway from South Baymouth to Little Current—over which have passed thousands of tourists as well as archæological survey parties from the University of Michigan—extended an Indian site of almost unbelievable magnitude and richness. On the surface, among grass roots, leaves, and moss, where village children have played in the woods through the years, were hundreds of large leaf-shaped blades and other artifacts! Most of them ranged between 6 and 9 inches in length and were easily seen, even at a distance! These, together with the situation of the site, indicate that a very early or pre-ceramic Indian culture existed there on three slopes of a large hill. Traces of some such culture were a primary object of the survey, for it was hoped that some early people derived from those at George Lake[1] might have moved across Manitoulin Island and into the Bruce Peninsula—but there was not the slightest expectation that anything would be found comparable to the Sheguiandah Site in quantity or extent.

No quartzite finds whatever have been reported from the island. A local collection contained five large quartzite blades, but they were found on an island not far from the George Lake sites. Interest grew, however, when a number of quartzite outcroppings were observed in the Sheguiandah region. The great discovery came when a brief stop was made on the highway, in order to scan a small garden plot with the aid of field glasses. A glittering quartzite flake was observed, challenging investigation, although it seemed probable that it had been flung from the highway in the course of blasting operations. A brief search of the garden produced numerous flaked chips and blocks of quartzite. Then a complete crude quartzite blade was found, very much like some of the George Lake specimens! Within half an hour some two dozen broken blades were discovered in the small plot.

At first it was thought that a small camp must have existed at the base of the hill, probably on the shore of an arm of Georgian Bay, long ago when the water was much higher than it is now. Soon, however, it was seen that artifacts occurred all along the western face of the hill and were most numerous at the top, quite near a quartzite outcropping. Evidently the Indians had quarried material there for their tools. Many small blocks of the quartzite were lying about the area, where they had been dropped.

The entire top of the hill was wooded; the search, therefore, was first continued in open pasture along the southern face of the hill. Many more

[1] Greenman, Emerson F. and George M. Stanley. The archæology and geology of two early sites near Killarney, Ont. Papers of the Michigan Academy of Science, Arts, and Letters, Vol. 28, pp. 505–530. 1943.

artifacts were found in the grass roots. Heavy concentrations of quartzite blocks, resembling a storm beach, were found at the brow of the hill, and scattered throughout were artifacts in a very crude state, suggesting that they were made on the spot.

The supposed storm beach extended into the woods, there assuming the form of a ridge perhaps eight feet high, composed mainly of quartzite boulders and cobbles that may have been rounded by wave action. The ridge led eastward and then northeast in a great curve for 60 rods or more. Fine specimens—often broken—were found along its top, sometimes lying in the midst of little nests of fine chips or flakes, just where they had been made. Other specimens occurred on the outer face of the ridge and on the slope of the hill to the south. Toward the northeast extremity of the ridge, fewer artifacts were found, both on the ridge and on the wooded slope. At the base of the hill on the east, however, among large quartzite boulders evidently used as work benches, were numerous little piles or clusters of quartzite flakes. Percussion bulbs on some flakes left no doubt as to their origin.

Upon returning to the top of the hill, an exposed quartzite ridge—a gleaming white mass in the dense foliage, running roughly parallel to the storm beach and to the north of it—was examined. At its base were concentrations of quartzite debris. Flakes were observed among heaps of blocks; careful search revealed artifacts also, usually crude objects evidently discarded. Such concentrations continued to the top of the ridge, where quarrying operations had clearly been carried out. Vertical lines of weakness in the quartzite had made it possible for the Indians to wedge off blocks, leaving a low vertical face along the top of the ridge. All along this face, but particularly at the base of it, were masses of quartzite spalls and blocks, together with many artifacts. A few finely chipped but broken specimens were recovered; most of them were crude. An occasional complete and fine blade was found lying among small ledges about the quarry, almost hidden by a covering of rock moss.

A second and much higher ridge, parallel to the first and north of it, was next examined. As before, heavy concentrations of blocks and debris containing artifacts were encountered at its base and at various points along its slopes. Toward the top, however, a truly amazing site was revealed. Spreading out in a great fan below an Indian quarry and covering about one third of an acre, a solid paving of quartzite blocks, chips, and worked fragments was revealed! Blades ranging from crude to fine specimens were found over the surface of the fan—and there was no indication of how deep the mass of debris might go! Artifacts, including one quartzite hammer, were particularly numerous right at the quarry; there, on a level space, doubtless resulting from the removal of quartzite, moss had almost hidden them. Quantities of blades must still lie under the moss. Debris and artifacts occurred on the north face of the ridge, where quarrying had also taken place. On the steep and bare northern face of the main hill,

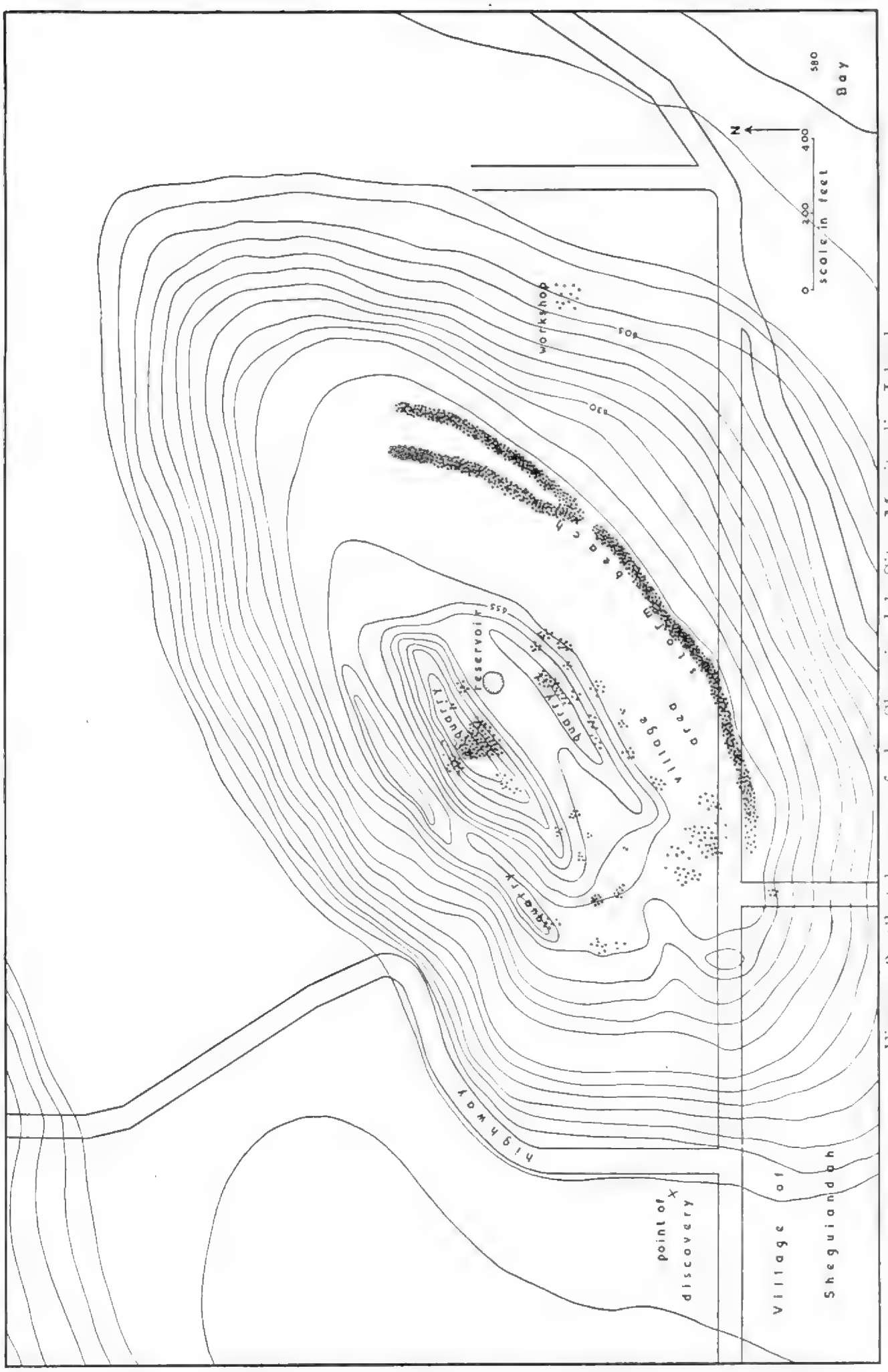


Figure 3. Sketch map of the Shequiandah Site, Manitoulin Island.

much debris had accumulated, but the angular form of the blocks and the absence of artifacts or flakes bearing percussion bulbs showed that this was mainly the result of frost action.

Throughout the woods at the western extremities of the ridges were heaps of quartzite blocks. Many artifacts were recovered from among them. Occasional little piles of fine chips were seen, often with a broken blade or two among them.

Between the quarry ridges is a flat area containing a large circular depression, evidently several feet deep, filled with water. This was the only possible source of water observed in preliminary investigations.

Up to this point it was assumed that the entire site was no more than a gigantic workshop and source of material. Closer examination of a gently sloping area between the first ridge and the storm beach forced consideration of its possibilities as a habitation area. The above-mentioned reservoir of water would provide for many families in all but very dry seasons, while water was always obtainable immediately at the base of the hill. Evidently much chipping activity had been conducted in the sloping area, and it was quickly apparent that most of the finer chipping had been done there. Because of its situation on the top of a hill and the slow breaking down of this quartzite, soil accumulation is an extremely slow process. Hence, large artifacts dropped there thousands of years ago were still on the surface or thinly covered by leaves and moss. It was only necessary to examine the numerous little piles of chippings to find a large number of finely worked blades. Hitherto, finds were rather large and heavy blades or discarded crude objects; in this possible habitation area were found some small specimens, two or three of which might very well be projectile points. In addition, there were three or four quartzite scrapers here. It is not unreasonable to suppose, therefore, that careful excavation would produce more of the small artifacts. Picking them out of countless millions of chips in the preliminary surface collecting was extremely difficult. At every step, throughout the wooded habitation area, the scrunching of quartzite chips under the leaves gave proof of the almost unbelievable extent of the chippings. A small test hole in the central part showed only a mass of chippings to a depth of one foot, set in scarcely any soil. It is anticipated that artifacts will be found throughout this material.

There is further evidence that the site is not merely a workshop: with the exception of two smaller sites in the vicinity—both well situated for camping purposes—no other sites of this culture were found, although the survey reached into almost every part of the island. Only one quartzite blade was seen elsewhere on Manitoulin. If the Sheguiandah Site had been only a source of material, surely some of it ought to have been found, even on distant sites.

There is a suggestion that some of the finished blades were carried into the southwestern part of the province, however. An excellent large specimen has been found at Mitchell. Smaller blades have been reported—one from the Bruce Peninsula and one from Goderich. A very few broken

blades, made from the same type of quartzite, have been found along the Thames valley. The materials in small quartzite projectile points found in southwestern Ontario appear to have come from other sources.

Was the site occupied only once and by a large number of Indians or by small bands over a long period of time? The enormous quantity of chippings, the extensive quarrying operations, and the presence of nearly five hundred specimens on the surface among moss and leaves suggest a lengthy occupation. Cultural change was a slow process in pre-ceramic times; however, excavations may produce some stratigraphy or evidence of changing styles in the tools on the basis of superposition. Preliminary studies reveal curious differences in the distribution of different artifact types over the site, but these may arise out of insufficient samples or from customary selection of different areas for such activities as the blocking out of crude blades or the finishing of fine specimens.

For what purpose were these blades made in such numbers? How could they answer the needs of any subsistence pattern? From surface collections it appears that very few, if any, projectile points are present. Few of the blades could even be used as spear-points. Yet a hunting-fishing-gathering economy must have prevailed. A very few quartzite scrapers have been found, but not enough to suggest any extensive dressing of skins. It seems probable, therefore, that many of the big blades were also used as scrapers or intended for such use, either hafted or simply held in the hands. Some may have been hafted and used as axes or club heads. Game might have been taken in deep snow with such implements —or by such methods as pitfalls or driving animals over the great limestone cliffs in the vicinity. Fishing could have been a major activity whenever game was scarce.

How long ago was the site occupied? If we assume that Manitoulin Island was under water until about 7,000 years ago, we must suppose that the site is still younger, allowing some time for emerging land to become habitable. The lowest occurrence of blades and chips is about 60 feet above the present level of Lake Huron. We cannot be sure on present evidence, however, that these did not reach the low level by sliding, frost action, or by being thrown there. The determination of this point will be one of the objects of the expedition planned for the summer of 1952.

Two blades are of particular interest because of their condition. Both show considerable smoothing over their surfaces, such as is accomplished by wave action. At George Lake it was possible to associate artifacts with beaches and hence with time periods on this basis, but as yet no such association is indicated at Sheguiandah. One of the blades was found high on a quarry ridge. Both of its surfaces are worn smooth—the under side more than the upper. That it has long lain in the position in which it was found is indicated by the growth of moss on its upper surface.

Typologically the artifacts are early. Their nearest relationships seem to be with the George Lake sites, some twenty miles away. Many of the artifacts are identical. Projectile points are rare or absent in both cases. Even the semi-lunar blade of George Lake is present on the

Sheguiandah Site, although only a few of them have been found. Yet it cannot be supposed that the Sheguiandah Site is nearly as old as the estimated age of the George Lake site.[1] This probably means that over a period of several thousands of years there was almost no cultural change in the immediate area, other than a probable increase in population and a shift from semi-lunar to leaf-shaped blades. This question is further considered in a survey report for 1951.

There is little reason to suppose that the Sheguiandah Site is not earlier than ceramic cultures. Indeed, one small Point Peninsula site nearby yielded evidence that its occupants had found one of the big blades, just as they are now found, and had unsuccessfully tried to re-work it! It is not considered likely that the Indians on the Sheguiandah Site would long have isolated themselves so completely in the midst of Indians who were using pottery, flint, the spear, and the bow and arrow.

SUMMARY

On a hill with exposed quartzite ridges, near the village of Sheguiandah, Manitoulin Island, was discovered in 1951 an extensive and prolific Indian site believed to represent an early or pre-ceramic culture. Surface finds showed a preponderance of large leaf-shaped blades, with few or no projectile points present. All were made from quartzite, quarried from ridges across the top of the hill That the site was not merely a workshop is suggested by the presence of a reservoir of water between the quarries and by the absence of quartzite blades or chips elsewhere on the island.

The enormous quantity of chippings and artifacts indicates a long occupation of the site. The people must have had a hunting-fishing-gathering economy. In all probability most of the large blades were used as scrapers, either hafted or simply held in the hands. Some may have served as ax heads.

The exact age of the site cannot be determined on present evidence, but it is thought that Manitoulin Island was under water until about 7,000 years ago. The lowest occurrence of artifacts and chips is about 60 feet above the present Lake Huron level. It is possible, however, that these have worked down the hillside by frost action and slipping. Two of the blades are clearly water-worn, but no association with a beach is as yet recognized.

The blades most nearly resemble the finds at George Lake but cannot possibly be as old as the estimated age of the George Lake sites. Probably the Sheguiandah Site represents a cultural descendant from George Lake, with very little cultural change taking place in the area over several thousands of years. If this can be established, it is of the greatest significance in our understanding of the pre-history of Ontario. Continuity would be achieved for this early period, where before only a vast and unexplained time gap was seen.

[1] Estimates by various geologists and archæologists have generally ranged between 10,000 and 15,000 years for G.L. 1, on geological evidence: the site is associated with a beach 297 feet above the present level of Lake Huron.

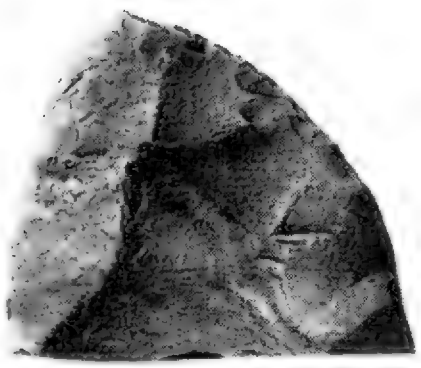
PLATE XII

Quartzite Artifacts from the Sheguiandah Site
($\frac{1}{3}$ natural size)

Figure 1. Broken blade. From high terrace. Neg. No. J964.
Figure 2. Scraper. From high terrace. Edge retouched. Neg. No. J962.
Figure 3. Broken blade. From high terrace. Neg. No. J966.
Figure 4. Blade. From high terrace. Neg. No. J965.
Figure 5. Blade, broken at base. From Ma^{v}5. Neg. No. J951.
Figure 6. Blade. From high terrace. Neg. No. J960.
Figure 7. Blade, unfinished. From high terrace. Neg. No. J959.
Figure 8. Blade. From high terrace. Neg. No. J954.
Figure 9. Semi-lunar blade. From high terrace. Neg. No. J963.

Photo by E. C. Elliott

PLATE XII



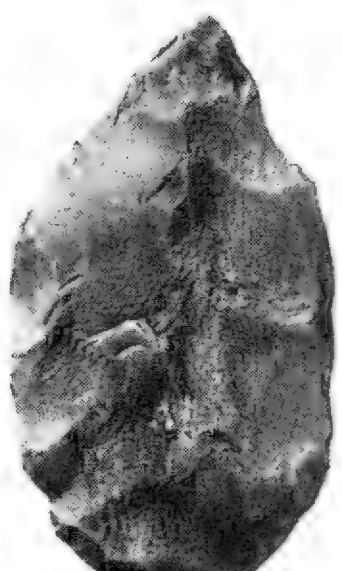
1

2

3

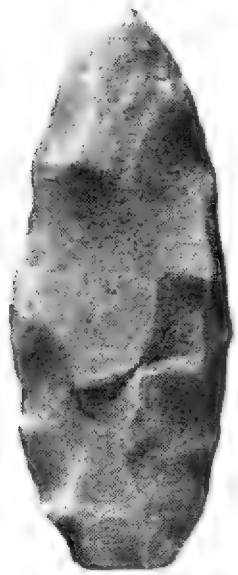
4

5



6

7



8

9

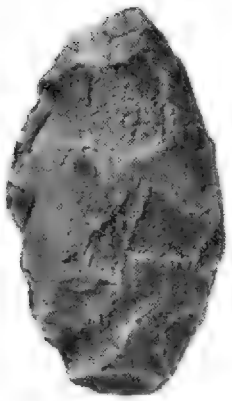
PLATE XIII

Quartzite Artifacts from the Sheguiandah Site
(⅓ natural size)

Figure 1. Blade. From high terrace. Neg. No. J944.
Figure 2. Scraper. Edge retouched. From high terrace. Neg. No. J955.
Figure 3. Scraper. Edge retouched. From high terrace. Neg. No. J953.
Figure 4. Small blade. From high terrace. Neg. No. J943.
Figure 5. Projectile point? From high terrace. Neg. No. J947.
Figure 6. Blade. From probable habitation area. Neg. No. J941.
Figure 7. Blade. From lower quarry. Neg. No. J946.
Figure 8. Blade. From probable habitation area. Neg. No. J945.
Figure 9. Broken blade, weathered side. Note lichens along edges. Central area water-worn. From high terrace. Neg. No. J948½.
Figure 10. Same as Figure 9, opposite side. Conspicuously water-worn. Neg. No. J948.
Figure 11. Blade. From high quarry. Neg. No. J949.

Photo by E. C. Elliott

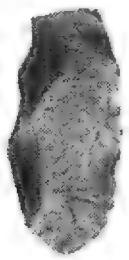
PLATE XIII



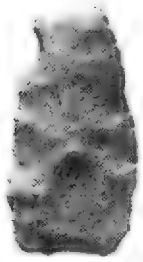
1

2

3

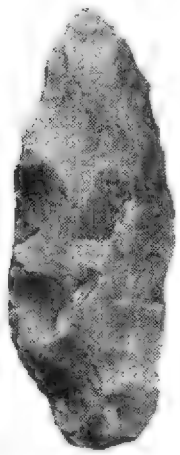


4

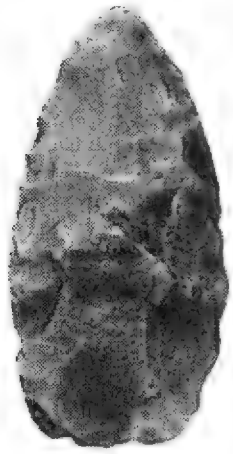


5

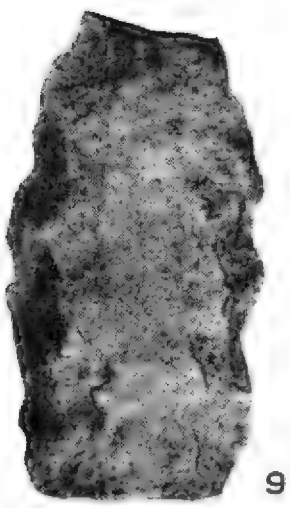
6



7



8



9

10

11

AN ARCHAEOLOGICAL EXAMINATION OF A HISTORIC SITE NEAR HAWKESBURY, ONTARIO

By Thomas E. Lee

During the field season of 1951 investigations were carried out at a site along the south bank of the Ottawa River, one third mile below the Little Rideau River and about five miles below Hawkesbury (See map, Figure 4). The purpose in mind was to discover, if possible, the exact position of Dollard's fort, in which he and his companions fought against the Iroquois in the "Battle of the Long Sault" in 1660. Local traditions have been held that the fight occurred on the south bank of the Ottawa, somewhere on the Ross farm (now Lavigne). No definite spot was indicated, but the attention of Dr. Marius Barbeau had been directed by some local fishermen to a ridge near the river where, in their opinion, Dollard's fight had occurred. Two days were devoted to a preliminary examination of certain earthworks there. Situated on the point of a hill formed by the junction of a small permanent stream and the steep bank of the Ottawa, the position offered an excellent case as a possible site for the famous battle. It is by far the best location in the area for defence against Indian attack, is adjacent to a good permanent water supply, commands a view of the Ottawa and the portage trail, is directly at the foot of the Long Sault at the precise point where slack water bears driftwood to the low shore and makes canoe landing an easy matter, and permits a view of an extensive low sloping area where a thousand Indians might comfortably camp, in just such circumstances as are described in the letters of Mother Marie de l'Incarnation (see map, Figure 5).

The hill point, some twenty-six feet above the waters of the Ottawa, was obviously much disturbed by some activities of white men. Five curious hollows, encircled by ridges of the earth thrown out of them, could not fail to challenge even a careless eye. The first step in the investigation was to discover their purpose and origin. Test trench 1 was cut through the south earth ridge of one feature and across the contained depression. From charcoal traces and from distinct outlines of dark humus-bearing material appearing in the reddish shale, it was easily possible to reconstruct the steps leading up to the present earthwork.

Someone—possibly an early trapper—had dug down through relatively loose shale to a hard shale sub-stratum at a depth of about two feet, making a small dugout about eight feet long and less than five feet wide. Small upright posts were set at from eight- to ten-inch intervals around the edges of the dugout, branches were placed against them on the outside, and earth from the dugout was banked up against the branches. Long poles were slanted across the dugout for a roof. These may have been covered with sods, bark, or a combination of the two. The structure burned and the banked earth collapsed into the dugout, leaving a depression with steep sides.

A narrow curving entrance—possibly a tunnel—had been constructed at the northwest corner of the dugout. In the southwest corner a fireplace

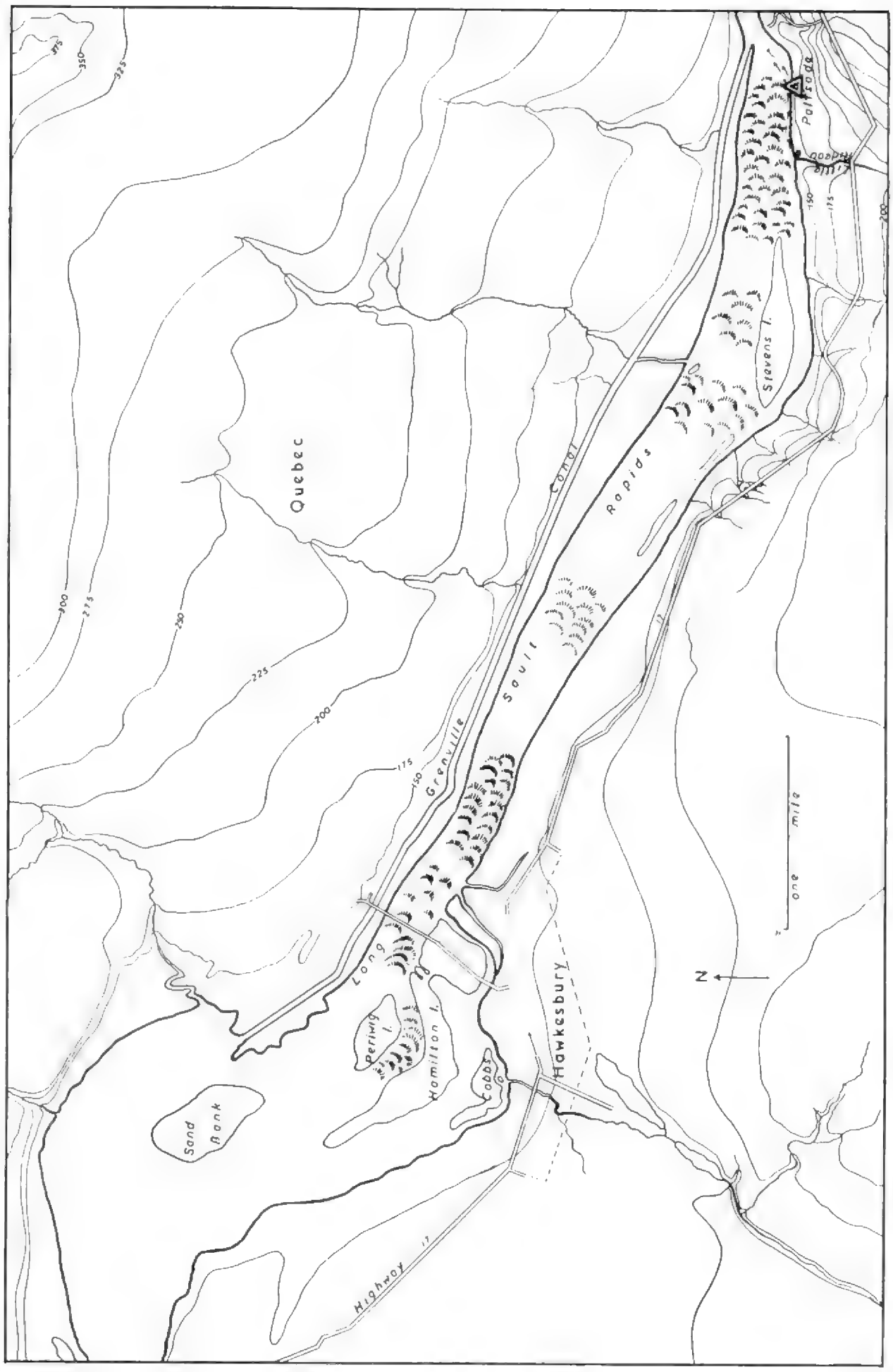


Figure 4. The palisade position at the foot of the Long Sault Rapids.

had been made by undercutting the walls. It was there, in the midst of ashes and charcoal, that three fragments of a bone china plate were found, one of which bore the stamp DAVENPORT in an arc over an anchor. A small fragment of a saucer and three hand-wrought square nails with very large heads were also found in the same deposit. The charcoal occurred in quite large fragments; all were cedar. The plate has been identified by Dr. Barbeau, who places it in the early 1800's.

With the distinct earthworks definitely excluded from our search for evidence of a battle or a palisade, closer inspection was made of various ridges, hollows, and large boulders scattered over the hummocky surface. It was noted that a few of the ridges, somewhat separated from each other,

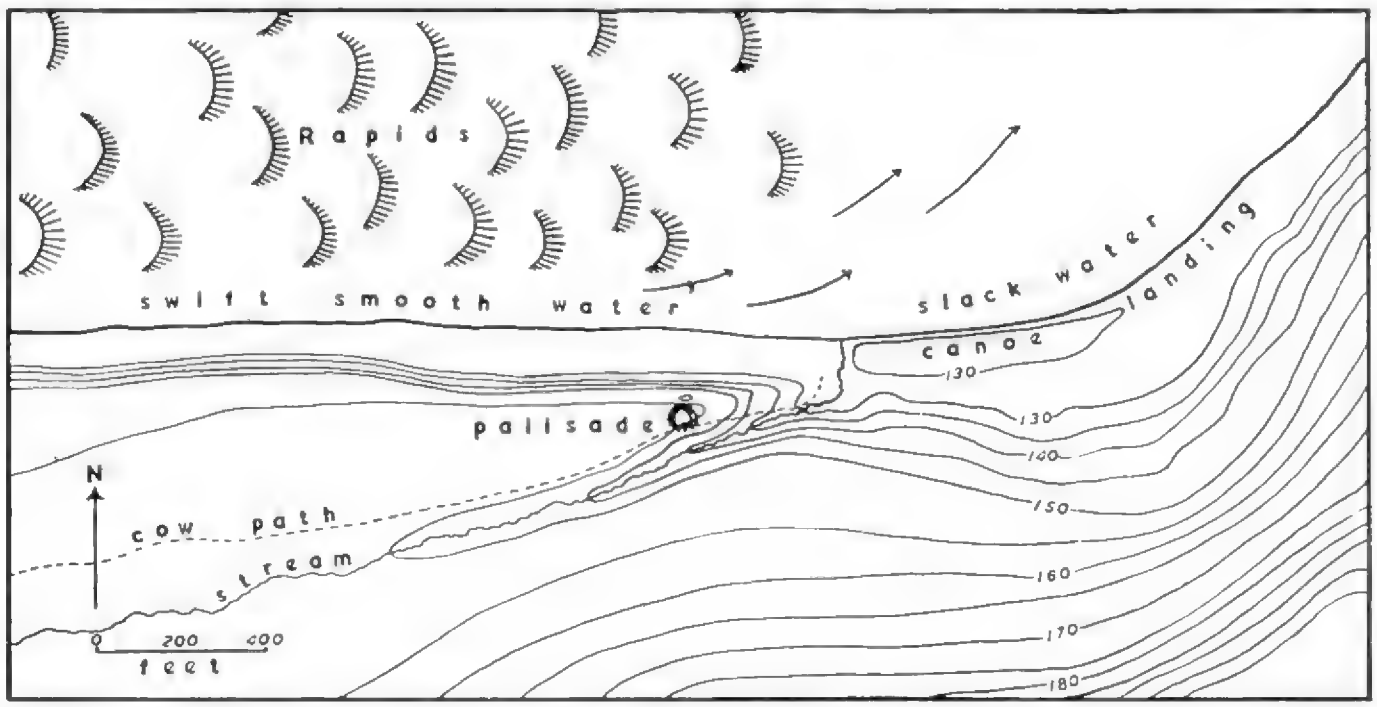


Figure 5. Canoes moving up-river were forced to land by the swift waters at the foot of the Long Sault.

could be projected and joined to form a large but irregular enclosure. Although it was necessary to delay the project until autumn, plans were advanced to explore these ridges by means of a series of radiating trenches. On November 13 work was resumed. Test trench 1 was extended southward across the maximum extent thought probable for any palisade that might have been erected on the site. A wide band of charcoal containing at least three post moulds[1] was at once picked up, extending south from the position of the dugout. It was obviously earlier than the dugout, for earth from the latter had covered an old humus line, under which occurred the charcoal features. At two points there were indications that burning posts had fallen westward; one of these was associated directly with a post mould. Since the band of charcoal developed an eastward

[1] By the term "post mould" we refer to those traces which remain in the soil for centuries or even for thousands of years to mark the position at which a post once stood. When the post decayed, the hole slowly filled in with the rotted wood, leaves, earth washed or splattered in by rain, dust, and other materials, forming an accumulation of humus or distinctive soil. If the post burned, charcoal and ash helped fill the hole. Careful planing of the earth will reveal a circular area darker than the surrounding soil. In order that other possible causes for it may be ruled out, such as tree roots or the holes dug by rodents, it is necessary to cut a vertical section through the centre of the dark area. If it is a post mould, the shape of the original post is revealed—and it is often possible to determine whether the post was cut by an ax or sharpened by burning.

curve, it was necessary to consider it as a possible section of palisade. The post moulds were sectioned and found to slant sharply to the northwest, along the charcoal band. Attempts to follow the charcoal traces were abandoned when several feet of clear soil were encountered on the southeast. The trench was then reduced in width from 5 to 3 feet and was rapidly pushed southward. At one point some faint dark stains and one possible post mould were seen, but these were not thought to be part of a palisade, at the time; later developments reversed the opinion.

One of the more obvious earth ridges, situated at the northeast side of the site where the land slopes gently eastward, next attracted attention. Test trench 2 was cut across it, with indefinite results. Charcoal traces crossed the trench at two points; at the inner or southwestern end, irregular charcoal masses gave the impression of camp fires rather than post moulds. However, at a point some five feet outward and just outside the crest of the ridge, several post moulds formed an irregular line across the trench. At the time these were not considered large enough to represent a defensive structure and were not followed up.

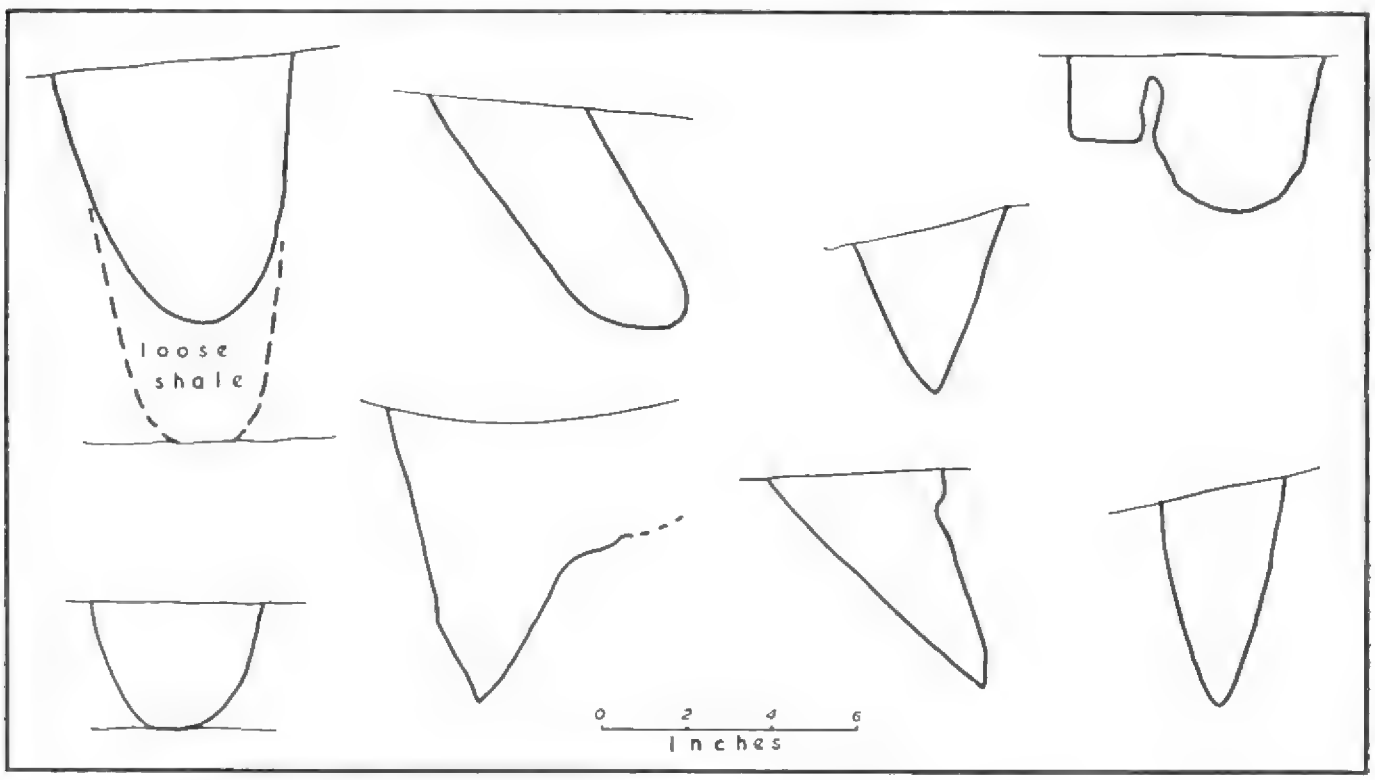


Figure 6. Cross-sections of post hole moulds in the palisade.

Consideration was again given to the curving charcoal traces of test trench 1. The curve was projected to the north across and beyond the dugouts; an east-west trench (TT 3) was opened to cut its estimated position. Several puzzling charcoal features were observed, including a short band of charcoal a foot wide and up to 5 inches in depth, but oriented in such a manner that no connection could be seen with the feature in TT 1. The band was followed a short distance west into the midst of a group of large boulders. Ash and charcoal concentrations increased there, and some bits of bone were recovered; none of these is human, and only one fragment offers much chance for identification: it may be part

of a moose rib. Two sections of iron were recovered and are of some interest. They are large enough to identify as sections of a hand-wrought hoop from a keg. One of these consists of two bands held together by a large rivet—evidently the point of overlap.

Test trench 3 was cut eastward for 30 feet, without trace of an extension of the feature in TT 1. Two excellent post moulds were encountered about three feet apart, but all other traces of charcoal or stains were vague or in no clear associations. At 25 feet east, a low ridge was crossed and several small circular dark areas were noted. The slanting and irregular positions of these seemed to exclude them from consideration as a palisade, and at the time no connection was seen.

A northerly extension of TT 3 was made to a point beyond the edge of the slope leading to the Ottawa. When within 6 feet of the edge, a line of small post moulds was found, crossing the trench in an east-west direction. All contained charcoal. About five feet farther north and just beyond the crest of a very low ridge on the edge of the bank, much stronger charcoal traces were encountered, running in a line parallel with the edge of the bank and with a depth of several inches. On the slope beyond, quantities of charcoal were scattered in a thin layer.

The trench was pushed westward 4 feet along the bank to follow the strong charcoal traces. Definite post moulds were found and sectioned (Figure 6); they were much larger than any previously examined. From them it was evident that a line of posts had stood along the top of the river-bank and just at this point had begun to curve away from the bank toward a group of large boulders of such prominence that they would surely be taken into consideration in any plan to defend the spot. The trench course was altered to follow this line and several excellent post moulds were revealed; they were not regularly spaced, however. When within a few feet of the boulders, spacing became still more irregular, and a scattering of post moulds left it in doubt whether the line of posts had curved outside of the boulders or had passed between them for convenient bracing. Considerable amounts of charcoal scattered in thin layers further increased the difficulties in tracing post moulds, now recognized beyond all doubt as marking the position of a palisade.

It was thought best to follow the palisade in the opposite direction, along the top of the river-bank from the point where first discovered. Much more distinct post moulds were found there, curving slightly toward a pair of large boulders near TT 2. A few moulds were at first sectioned, but with the pattern well established it was no longer necessary to continue this procedure. The work then went forward more rapidly, although each morning found the ground frozen a little more deeply. A mattock was used to cut loose the thick layer of frozen earth. Any artifacts present would probably be overlooked in these circumstances, but the important palisade traces lay below the frost level. At one point a pile of small rocks was found among the post moulds, evidently placed there for bracing purposes.

Upon approaching the two large boulders the post moulds once more were scattered, but in this case it was possible to trace the line outside the stones in a curve that aimed at the small post moulds described in TT 2. A pattern was thus established for the association of the palisade with large boulders, and it became possible to predict with accuracy projections of the palisade lines, thus saving much time. Test trenches 4, 5, 6, and 7 were quickly cut—and in each was found a line of post moulds, always oriented in the direction of a rough circle that would eventually join the line in the southwestern extension of TT 3. All post moulds noted in the latter trenches were small, with the exception of those in TT 7. Those in TT 4 were set across a natural earth ridge. They were strikingly reddish; apparently some bits of hematite were present in the moulds, possibly smeared by the shovel blade.

Since it was evident that the south end of TT 1 must have crossed the palisade line, a westward extension was made at the supposed point of crossing. At once several small but distinct post moulds were uncovered, curving to the northwest. By this time, frost had penetrated more than eight inches of soil; on November 24 excavations were suspended. The position of almost the entire palisade had been determined, and the remainder could be filled in by easy and short projections of the known lines (See map, Figure 7).

From careful examination of the palisade features, a great deal has been learned. It was by no means a perfect circle; rather, the enclosure was designed to take advantage of certain natural features, such as the contours of the land and many of the boulders which are scattered over the area. That the palisade was deliberately headed to pass outside all large boulders is clear indication that some importance was attached to them. It is at once apparent that they could have been used by attackers in climbing over the palisade, if left outside. Perhaps some thought was given to the possibility of bullets spattering or glancing on the rock surfaces to the greater danger of the defenders.

The variation in post sizes from section to section is evidence that the palisade was not built at leisure or according to any one specific plan, but rather was strengthened as far as possible at the weaker points—particularly on the high northwest side and the northern section where protection was afforded to the attackers by the river-bank, at an uncomfortably close range—in whatever time was available. This agrees very well with the facts that the posts were not neatly spaced and were not in any regular line, such as is found in Indian palisades in southwestern Ontario. The scattering of post moulds and the angles at which some were set in the ground show that the posts were braced in every makeshift way; the frequently wide spacing suggests that in all probability they were interlaced with poles and branches to close the openings. Further strength was doubtless gained from the inside by means of slanting brace poles. This may account for at least some of the small irregular post moulds or discolorations noted roughly five feet inside the palisade in TT 1, TT 2, and in east, west, and north extensions of TT 3. Similar traces were seen in

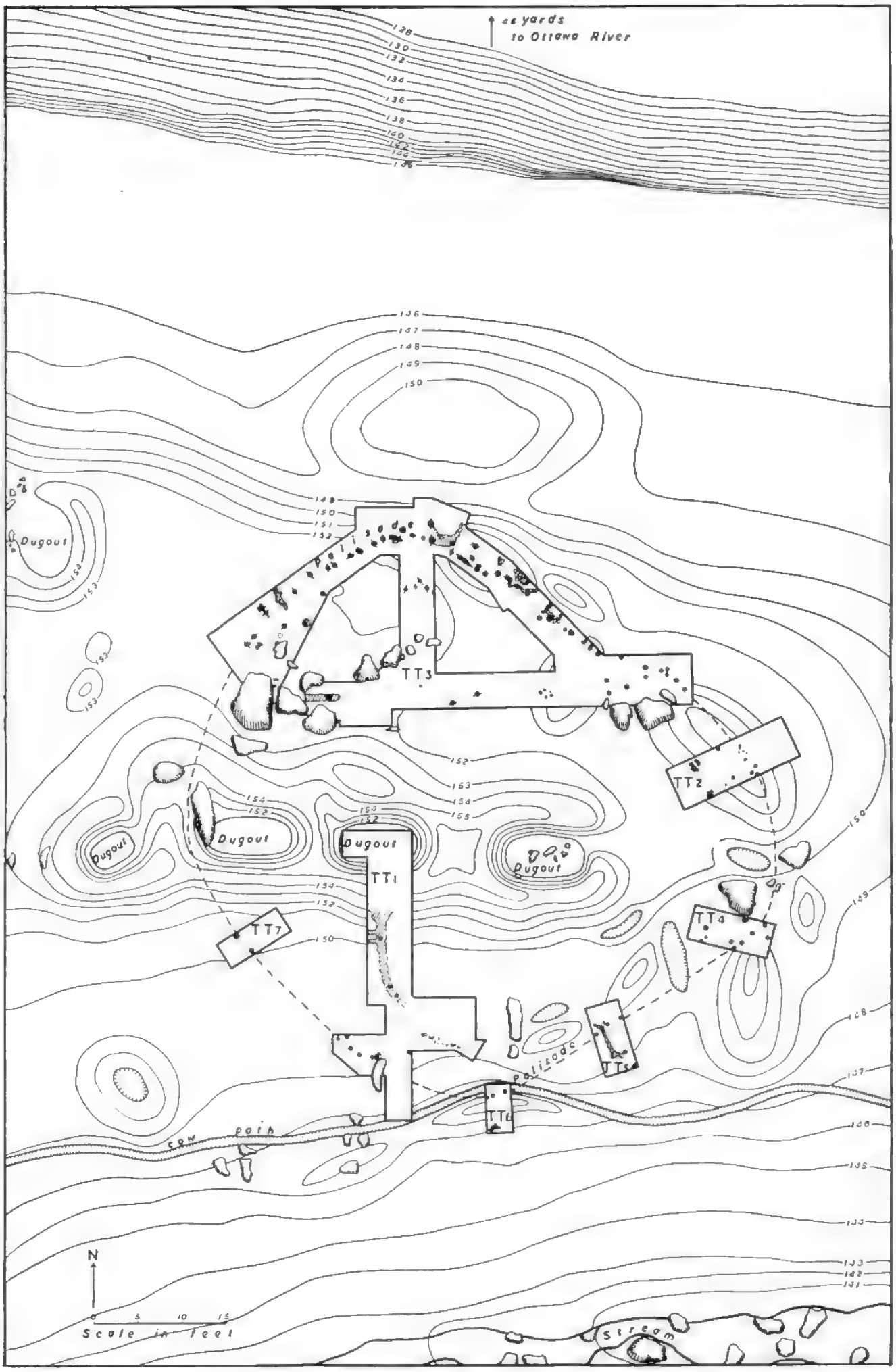


Figure 7. Palisade sections revealed by trenching.

TT 4 and TT 5, roughly two to three feet inside the palisade. On the other hand, a second or inner palisade may be represented, as indicated particularly by definite small post moulds in the north extension of TT 3, where some of the posts apparently stood upright. All of the definite post moulds in this inner circle were quite small, where examined. Great difficulty was experienced in making cross-sections of small post moulds in the crumbly shale, but with further work it would be possible to determine the angles at which the posts were set.

Although the artificial earth ridges are not more than 15 inches high at any point, it is clear that they were once much higher. The charred remains of the palisade lie under the ridges; the line of post moulds occurs on the outer slopes, two feet or more beyond the crests of the ridges which have in some cases spread to a width of 12 feet. Whatever soil is outside the line of post moulds now must once have been piled against the inside of the palisade, collapsing outward when the stakes burned. A few stones occur through this material, but they may be accidental inclusions, except for the pile of small rocks noted above.

From charcoal evidence, sometimes taking the form of straight bands such as might remain were a burning post to fall on the ground, it is perfectly clear that the palisade burned and that it fell outward at every point crossed by test trenches. This would be normal, of course, in any circular structure, but would necessarily happen if there were bracings of earth, poles, and stones on the inside.

The individual post moulds of the palisade supply us with further information. Those cross-sectioned range from 3 to 5 inches in diameter and from 3 to 8 inches deep, under top soil or shale from 2 to 6 inches deep. That they are not deeper is readily accounted for by the fact that nearly all are dug down to a shale sufficiently hard to require special tools, such as pointed spades or spuds. Many were rounded at the bottom; others were sharply wedge-shaped, indicating that the posts had been cut by metal axes. Some were apparently double holes, where two posts happened to be set side by side. A few were slanted in such a manner that the posts must have run along the palisade for bracing.

We may briefly consider the question of relationship of palisade and dugouts. Several factors indicate that they are of two different time periods. The evidence of the broken plate points to an early nineteenth century occupation for the dugouts, a rather late date for palisades in this area. The palisade runs in such a manner that it cuts through the dugout arrangement, leaving three inside and two outside. It is not unreasonable to suppose that all five were occupied at one time, for a man arriving later would make use, it would seem, of the holes already cut into this tough and difficult shale. If this is true, then it can be shown that no more than five men could possibly have occupied the three inner dugouts. It is extremely doubtful that any five men, armed with muzzle-loading guns, would have constructed a defensive palisade—in the haste indicated by its structure—for such it clearly is, with a circumference of 195 feet, forcing each man to guard about forty feet of palisade, assuming that all might

be within and capable of fighting. Any man discharging his gun would leave an additional 20 feet for each of his companions to guard, while he reloaded. Any two adjacent men firing at once would bring immediate disaster, exposing more than one third of the palisade. On the other hand, some sixty men such as Dollard commanded could reasonably hope to defend themselves against many times their number, with replacements for any who might be disabled. Other circumstances support the view that two time periods are represented. The earth from the dugouts is piled upon an older humus line, below which lie charcoal and features discussed above, believed to be associated with the palisade. It is also believed significant that no fragment of charcoal large enough for identification has been found in the charred remains of the palisade, whereas in the dugout were quantities of charcoal with quite large sections easily identified as cedar. This circumstance by itself strongly suggests that the palisade was considerably older.

It may be pointed out that all of this digging failed to produce weapons or other cultural material, unless we may count the sections of iron keg hoop. Too much should not be made of this circumstance, however. During much of the November digging, earth was removed in great frozen blocks which might contain even large objects such as axes. Again, we must remember that upwards of eight hundred Indians were roving over the small area of the fight, according to the statement of a survivor. Every visible article of value to the victors, whether in terms of use or interest, is likely to have been carried away by them—an opinion stated before visiting the site. Such items as coins, buttons, or boot nails are not regarded as likely finds, even if overlooked or discarded by the victors: these canoe men were probably dressed in deer skins and moccasins. No burials can be expected in this difficult shale. Further, according to documents, none of Dollard's men died until the last day of the fight. It is not to be supposed that the Indians would bury them, nor would Indians leave their own dead lying there. The nature of the soil makes it extremely unlikely that any human bones left on the surface would be preserved, unless imbedded in ashes as yet undiscovered. As for weapons, a very few might have been overlooked if covered by the fallen and burning palisade. In fact, two iron hatchets of an early type have been found on the spot by a local resident; one of these is illustrated. There are reports of a few other finds, including arrowpoints, but these must be largely discounted unless it becomes possible to trace them or their finders.

Although a few bones have been found, identification of them is difficult, other than that they are mammal bones. A few fragments show that the bones were split and broken in the Indian manner for extracting the marrow.

SUMMARY AND CONCLUSIONS

On a site at the foot of the Long Sault, on the south bank of the Ottawa River, test trenching revealed that five conspicuous features or earthworks were the result of activities of white men, probably trappers,

who had constructed semi-subterranean shelters there. None was large enough to hold more than two men. Fragments of a plate bearing an English name, found in the fireplace of one dugout, indicate that the shelters were in use sometime in the early nineteenth century. Earth from them covers old humus lines, under which are features believed associated with the palisade.

Other trenches revealed and followed the line of a palisade, obviously built for defence, since it followed the edge of a high river-bank and also was drawn out of its general circular form to pass just outside of every large boulder. Although shallow, the post holes were dug as deeply as was possible without special tools. The posts were irregularly spaced—sometimes side by side, at other times even widely separated. A confusion of small and large posts is seen at some points. The northern and north-western sectors particularly, being most vulnerable to attack, were strengthened far more than were other parts. The spacing is very good evidence that some interlacing of poles and branches must have been used. Some of the slanting post moulds, together with their scattered arrangement, show that the palisade was braced in every makeshift manner, particularly around the boulders. Ridges of earth are associated with the line of post moulds in such a manner that it is certain that the earth was once piled high against the inside, collapsing outward when the palisade fell. In general, only occasional stones are noted in the earth ridges, but at one point, certainly, stones were piled among the posts to give additional support. In cross-sections the post moulds show that metal axes were used to cut some of the posts.

It is not clear whether a second palisade stood some five feet within the greater circle. Certainly some small upright posts were set at one point in the line of discolorations observed there. Many of the charred spots, however, were left by slanting poles braced into the outer palisade.

Of cultural material, only sections of a hand-wrought keg hoop were found, other than in association with the dugout. Two early iron hatchets, however, were found there some years ago. Various other items reported from the site have not been traced.

From the above circumstances it appears that there were at least three occupations of the site, with time intervals of unknown duration. A reasonable assumption, however, can be made for the period between the first and second.

On the first occasion a palisade of very small poles was constructed, enclosing an area slightly more than sixty feet across and roughly circular. Such poles, if they were dry cedar, might last two or three years—surely not much more—before losing most of their strength; if green cedar, not more than one year. A second palisade—or possibly only a row of brace poles—forming a smaller circle inside may have been erected then or later, a point not determined by present evidence. Failure to find pottery, broken stone tools, or flint chippings suggests a very short occupation, if by Indians.

Some time later—not more than two or three years at most—a party of men attempted to use the palisade again. They attempted to strengthen it, especially at points most vulnerable. For some reason—and we may well suppose that it was a time factor—the work of reinforcement was not completed. On the northern side very heavy posts were set among the light stakes already there. Only slim posts stood facing the more gentle slopes to the south and east, where the guns of the defenders could command the approaches. The palisade was burned, and at every point examined it fell outward, after which the earth banked against it on the inside collapsed outward, covering the charred remains and forming the present low ridges.

Accumulations of soil and formation of humus upon charcoal and features, overlain by earth from the diggings of the third occupation, seem to indicate a considerable time lapse, further supported by outstanding differences in the condition of charcoal from the palisade and from the dugout. Probably trappers settled upon this point of high land for their winter quarters. No association with the palisade is considered possible, after examination of all evidence.

Does the palisade mark the scene of Dollard's famous fight? We have seen that it is of a size in keeping with the number reported in Dollard's party, from the standpoint of reasonable and adequate defence. The near absence of weapons or other metal objects bears little weight against the site and may be said, indeed, to argue for it.[1] The keg hoop must be considered, too, when it is recalled that Dollard unsuccessfully tried to hurl a keg of powder over the palisade during the fight. The site and its surroundings answer to a remarkable degree the recorded descriptions of the land and river features, obtained from a survivor of the fight. It is certainly at the foot of the Long Sault and in the most outstandingly good position for defence; at the same time it brings the canoe passage and the portage trail within easy range of their guns. The conspicuous canoe landing area at the base of the rapids has good and extensive camping facilities and can be seen from the palisade position, even through the present growth of cedars. The palisade structure corresponds very closely to that described by the survivor. In so far as historic sites of this nature can ever be proved, lacking as they do buried tablets or stone monuments (which would at once be labelled as fakes if they were found!), it is the considered opinion of the writer that much more archæological evidence than could reasonably be expected (or was expected!) has already been found and that at every point it supports the view that Dollard and his men fought behind the palisade discovered.

---

[1] On the small top of Starved Rock, Illinois, now accepted as the site of LaSalle's Fort St. Louis—a military outpost known to have been occupied for ten years by LaSalle's men and to have been subjected to at least one Indian attack in historic times—a University of Chicago expedition, in which the writer took part, succeeded in finding only two musket balls, one French coin, four musket locks, and a few iron knife blades, among other objects, in two months of digging by a crew of about ten. Dollard's fort stood for only ten days.

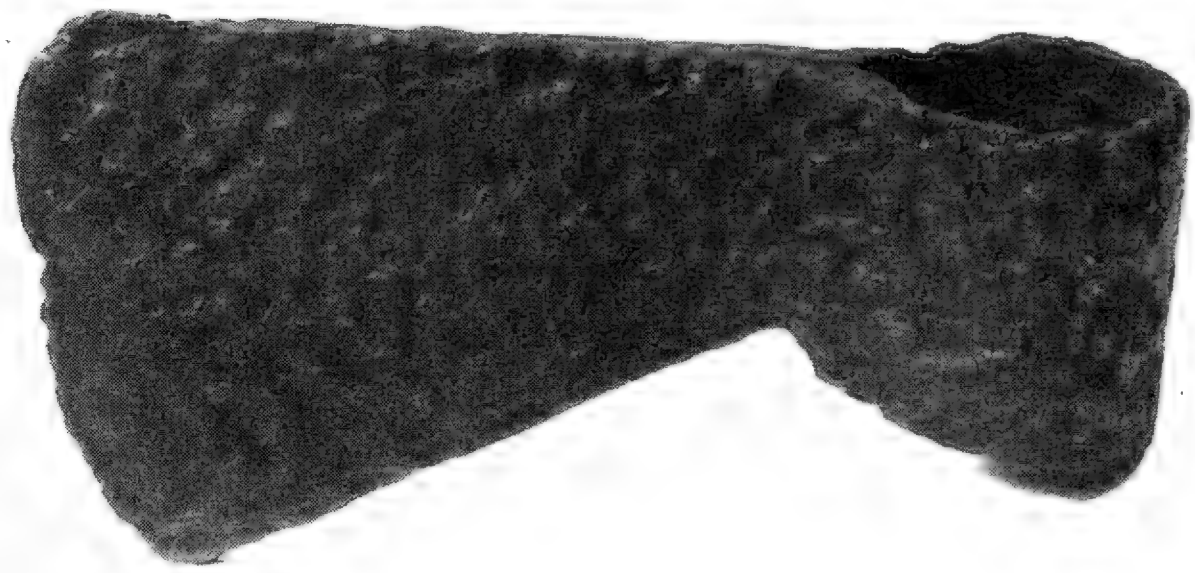
PLATE XIV

A. Tree-top view of three dugouts used by early white trappers.

B. View showing part of a European bone china plate, undisturbed, in the ashes of a fireplace within a dugout. Pencil points to an iron nail.

PLATE XV

A. A line of post moulds, cross-sectioned, marking the position of the former palisade. 1-2-1951. T. E. Lee. J909.



B. One of the European iron hatchet heads found on the site. Length 6 inches.

SUR LE SENS DE L'ÉVOLUTION SOCIO-CULTURELLE DE L'ÎLE-VERTE

Par Marcel Rioux

Tout groupe humain évolue; même le plus conservateur n'est pas entièrement statique. Que ce soit sous l'influence d'agents extérieurs à un groupe donné d'individus ou en vertu du principe de changement immanent, la culture de tout groupe tend à se modifier. Ce concept du principe de changement immanent a été emprunté à Sapir[1] qui l'a formulé pour expliquer certains phénomènes d'évolution linguistique. Le changement immanent s'oppose à l'accident historique en ce sens que le premier est le résultat des seules forces d'un circuit considéré comme fermé, alors que le second est essentiellement le résultat des processus de diffusion. La langue de tout groupe, quelque isolé soit-il, évolue sans cesse. Il en va ainsi des autres éléments culturels.

Le Canada français, quoi qu'on en ait, n'échappe pas à cette règle. Dans l'essai qui va suivre, nous n'avons pas voulu étudier la culture globale de ce groupe ethnique, mais plutôt observer comment évolue une petite communauté qui en fait partie, le village de l'Île-Verte. Bien que nous ayons étudié dans le même but, en 1951, une autre paroisse canadienne-française, celle de Laval-sur-Montmorency, nous nous abstiendrons ici de comparer les données et les conclusions de ces deux études.

Et tout d'abord, est-il possible pour l'anthropologiste de s'attaquer, avec les méthodes et les concepts qu'il a mis au point en étudiant des unités tribales, à l'étude de systèmes socio-culturels plus complexes, les nations modernes par exemple? Le concept-clé de l'anthropologie, celui de culture, est-il adéquat pour rendre compte de l'infinie complexité des systèmes sociaux du monde contemporain? Le concept de culture, tel qu'il s'applique aux unités tribales, représente le comportement idéal, prévu, de tous les membres d'un petit groupe homogène. En dépit des divergences individuelles le concept de culture s'applique aux récurrences du comportement du groupe; dans les unités tribales, il n'y a pas de sous-groupes qui, comme dans nos sociétés contemporaines mènent une existence quasi-autonome.

La culture, telle que définie par les anthropologistes qui étudient des unités tribales, veut aussi dire que c'est un tout organisé, structuré, intégré; c'est un vaste réseau de symboles dont tous les individus qui participent à une culture donnée comprennent la signification. Peut-on appliquer cette notion aux nations contemporaines? Présentent-elles un tout aussi intégré? Contrairement à ce que l'on voit dans les unités tribales, plusieurs sous-groupes existent, quelquefois assez différents les uns des autres. Plusieurs institutions sont supra-personnelles et peuvent être étudiées sans aucun recours aux individus qui ne les connaissent pas du tout, ou les connaissent mal.

---

[1] Sapir, E. *Language*, 1921, pp. 157–158.

Afin d'analyser les éléments qui composent les cultures nationales il faut distinguer, dans de tels systèmes, certains niveaux d'intégration socio-culturelle. "D'après ce concept, dit J. H. Steward, une culture nationale globale est divisible en deux sortes de phénomènes généraux: les premiers, ceux qui agissent à l'échelle nationale et doivent être étudiés comme tels; les seconds, ceux qui sont le propre des segments socio-culturels ou des sous-groupes de la population. Ceux-là comprennent les phénomènes supra-personnels, plus ou moins structurés,—souvent fortement institutionnalisés, —tels les formes de gouvernement, le système éducationnel, le droit, l'organisation militaire et autres. Ces phénomènes comportent des aspects qui sont d'ampleur nationale, quelquefois internationale, et qui doivent être étudiés en dehors des individus qui y participent[1]." D'autre part, le comportement même des individus qui font partie des sous-groupes ou des segments socio-culturels se prête à l'observation directe de l'anthropologiste.

C'est dans les études d'acculturation ou de changement social que l'utilité d'étudier le comportement de ces groupes est le plus apparente. L'étude de ces phénomènes dans leur aspect formel et institutionnel ne peut que faire apercevoir l'aspect statique des phénomènes alors qu'une étude directe comme celle qui est d'usage en anthropologie nous fait voir l'aspect dynamique des phénomènes, le passage d'un état à un autre. Sans compter qu'une telle méthode nous fait entrevoir les différences qui existent entre ce qui devrait être fait et ce qui se fait réellement. Il y a aussi une troisième catégorie de phénomènes qu'une telle façon de procéder nous fait entrevoir; entre ce que la société devrait faire pour se conformer aux normes et à l'idéal et ce qu'elle fait réellement, il y a aussi ce que les individus croient qui devrait être fait. Pour comprendre le sens de l'évolution d'une société il faut de toute évidence prendre en considération tous ces facteurs.

Dans notre étude de l'Île-Verte nous n'envisagerons que les manifestations et les significations locales des phénomènes qui, même s'ils sont fortement institutionnalisés à l'échelle nationale, n'en conservent pas moins une fonction locale, que seule une enquête de nature de celle que l'anthropologiste fait peut nous faire apprécier. Ne pourrait-on pas dire qu'une des tâches les plus spécifiques de l'anthropologie, quand elle étudie des cultures nationales, ne serait pas de relier les institutions nationales aux individus et d'essayer de découvrir comment fonctionnent réellement ces institutions au niveau des individus eux-mêmes. Plus précisément, nous voulons nous servir des données que nous avons recueillies à l'Île-Verte pour vérifier jusqu'à quel point s'appliquent les théories de ceux qui se sont occupés de typologie sociale et plus particulièrement la théorie de Howard Becker. Ce dernier, dans son livre, *Through Values to Social Interpretation* donne la définition suivante des sociétés sacrée et profane dont il fait les types extrêmes de sa typologie sociale: "Une société profane est celle qui fait accepter à ses membres le désir de changer et leur en donne les moyens; une société qui possède un système de valeurs imperméable est sacrée tandis que celle qui laisse pénétrer son système de valeurs par d'autres éléments est

[1] Steward, J. H. *Levels of sociocultural integration: an operational concept. Southwestern Journal of Anthropology*, vol. 1 No. 4, Winter 1951, p. 231.

profane. A ce critère fondé sur l'acceptation ou la non-acceptation de nouveautés culturelles, on peut ajouter les critères d'intégration et de désintégration, d'isolation et d'accessibilité, d'homogénéité et d'hétérogénéité qu'on rencontre dans les sociétés sacrées et profanes[1]."

Sans reconnaître nécessairement à ce critère que nous appellerons ici "attitude envers le changement" toute l'importance que Becker lui accorde dans la construction de ses types idéaux et sans préjuger des résultats qu'une étude déductive plus approfondie de la typologie sociale pourrait apporter, il faut reconnaître que c'est pour le moins un caractère important et qu'il peut être utilisé comme hypothèse de travail pour étudier certains aspects de l'évolution d'une communauté moderne du Québec. Nous nous demanderons si parmi les facteurs qui rendent compte de l'évolution de cette petite communauté isolée, cette attitude envers le changement joue le rôle de caractère essentiel dans la détermination de la cause des changements observables.

Avant de nous engager dans l'étude proprement dite du village de l'Île-Verte nous voudrions le situer culturellement. Tout d'abord, il faut dire que si la province de Québec est quelquefois qualifiée de société paysanne[2], ce ne saurait être que par rapport à des sociétés très urbanisées, dont elle diffère certes, mais ne diffère-t-elle pas davantage encore du type de la société sacrée ou de la folk-société, type qui par définition est à l'extrême opposé de la société profane ou urbaine. Elle diffère même, d'une façon appréciable, des sociétés paysannes de l'Europe, qui elles-mêmes se sont déjà éloignées de la société sacrée-type. Alors que, par exemple, les agglomérations paysannes de France ont été très fermées jusqu'au début du XX^{e} siècle[3] et qu'elles le sont encore aujourd'hui jusque dans une certaine mesure, il n'en va pas de même de la société canadienne-française, qui, depuis longtemps a subi d'importants brassages de population et, qui à cause de son voisinage avec d'autres cultures, a été à même de leur emprunter plusieurs éléments. Si l'on fait de l'acquisition des idées de changement et de progrès des caractéristiques de la société profane, il est évident que ces idées semblent avoir pénétré plus tôt et plus vite au Canada français que dans les campagnes européennes. Si nous remontons un peu dans le temps, ne pourrait-on pas dire que les immigrants français qui, sans être tous paysans, participaient en grande majorité à une culture de forme paysanne, se mettaient, en acceptant de quitter leur pays, dans un état d'esprit propice à l'acceptation du changement et d'idées nouvelles. Comme ils venaient de provinces différentes, isolées et fermées sur elles-mêmes par définition, et qu'ils possédaient par ce fait même des habitudes linguistiques et des coutumes différentes, une des premières conditions d'unité et de concorde fut de consentir un certain effort de nivellement qui se traduisit, vraisemblablement, par l'abandon d'un certain nombre de particularités. Il semble donc que la nécessité où ces immigrants se trouvaient

---

[1] Becker, p. 67.

[2] Dans sa préface du livre de Horace Miner *St. Denis, A French-Canadian Parish*, Robert Redfield parle de Saint-Denis comme d'une communauté paysanne. Il fait de l'habitant canadien-français l'unique paysan, ou presque, de l'Amérique du Nord. Même si on restreint l'appellation de société paysanne aux communautés rurales du Québec, encore là, il est évident qu'il faudrait établir une gradation entre ce type de paysan et les habitants d'autres parties du monde qui participent à la même classification.

[3] Leroi-Gourhan, A. L'Encyclopédie, tome VII, p. 7.24.3.

de trouver un "modus vivendi" acceptable pour tous les individus en présence les ait mis dans un état d'esprit favorable à l'acceptation du changement.

Un autre facteur qui favorisait l'adoption de nouveaux traits culturels et créait un certain climat de néophilie, ce sont justement les relations que très tôt ils entretinrent avec des peuples dont la culture différait beaucoup de la leur: les Amérindiens d'abord et les autres Européens qui colonisaient le continent. Si les Canadiens français n'ont pas emprunté beaucoup d'éléments à la culture amérindienne, les contacts qu'ils eurent avec ces peuples si différents d'eux-mêmes ne les prédisposaient pas moins à regarder d'un œil moins étonné et moins réprobateur des cultures différentes de la leur. (On note, aujourd'hui, que dans les villages canadiens-français, où des citadins passent l'été, les paysans, bien que n'ayant peu ou pas de contacts avec ces derniers, n'en manifestent pas moins plus d'indulgence pour des mœurs différentes des leurs.)

L'économie du paysan canadien cessa plus vite qu'en Europe par exemple d'être une économie de subsistance. Les grands monopoles économiques, le besoin qui fut vite créé de beaucoup exporter pour subvenir à ses besoins firent du Canadien un homme économiquement différent du paysan européen. Le voisinage du Canadien avec le plus grand peuple industriel du monde, les États-Unis, les contacts incessants qu'une partie de la population canadienne-française eurent avec les Anglais accélérèrent la transformation du paysan en ouvrier industriel ou agricole.

Si les conditions économiques et politiques ont favorisé l'urbanisation du Canada français et qu'il peut justement prétendre être en avance sur plusieurs autres groupes du monde occidental et à fortiori sur presque tous les groupes des autres continents, il est en retard sur les États-Unis et, à un degré moindre sur le reste du Canada. On peut discerner plusieurs causes pour expliquer ce décalage du rythme d'urbanisation du Canada français et ce qu'on pourrait peut-être appeler les éléments tangentiels de son évolution. Après la conquête du Canada, les Canadiens se sont repliés sur eux-mêmes et la force du "nous" s'est accrue sous l'influence de l'élément d'opposition que représentaient les Anglais. Ce nouvel esprit ne favorisait pas les changements culturels, loin de là. Au contraire, dans un traditionalisme volontaire, traditionalisme qui diffère du traditionalisme routinier d'autres sociétés et qui caractérise aussi certaines périodes d'inertie de ce même Canada français, les Canadiens ont affirmé leur désir de ne pas changer, de rester ce qu'ils étaient. On peut noter tout de suite que ce refus de changer, cette imperméabilité du système des valeurs dont parle Becker pour caractériser la société sacrée ne semble pas être partie de cette société à l'état pur mais semble plutôt être l'effet d'éléments extérieurs; en d'autres termes, elle semble être une réaction envers des éléments extérieurs plutôt qu'un élément constitutif de la société sacrée. Nous reviendrons là-dessus lorsque nous analyserons l'Île-Verte. La religion catholique, d'autre part,

de par le rôle qu'elle fut amenée à jouer au Canada français, après la Conquête, fut loin de favoriser les désirs de changement qui auraient pu naître dans la société canadienne; son rôle en fut un de conservation, d'intégration, de persévérance plutôt que d'innovation.

Voilà donc brièvement esquissées quelques-unes des raisons historiques qui peuvent rendre compte jusqu'à un certain point des phénomènes que l'on peut observer au Canada français en ce qui a trait à l'idée du changement et de progrès. Il est certain qu'il y a une relation entre l'idée de changement et l'idée de progrès. On ne change, on ne désire changer que si l'on croit que ce changement marquera un progrès. De là relation entre progrès et âge d'or. Une société qui place son âge d'or dans le passé,—comme c'est le cas pour les sociétés primitives et pour la société sacrée idéale[1],—sera beaucoup moins encline à changer qu'une société qui, au contraire, place cet âge d'or dans l'avenir. On peut d'ailleurs affirmer que l'idée de progrès, surtout de progrès indéfini, est caractéristique de la société occidentale moderne. La conquête du Canada par les Anglais a eu pour effet de marquer une coupure dans l'évolution de la nationalité canadienne-française en rejetant, pour une bonne partie de la population, dans le passé, l'âge d'or de la société. L'âge d'or fut pour eux non plus quelque chose qui devait arriver, si tant est qu'à cette époque la notion de progrès indéfini avait pénétré chez les habitants de la Nouvelle-France, mais ce fut pour eux une période qui datait d'avant la Conquête. De là leur désir de rester ce qu'ils étaient, de ne pas suivre les peuples de langue anglaise dans leur évolution vers les nouvelles formules économiques et sociales. Or, comme les peuples anglo-saxons ont toujours été à l'avant-garde des mouvements d'industrialisation, les Canadiens français, en s'opposant à leur influence et à leur mode de vie ont, de ce fait, quelque peu boudé l'industrialisation. Industrialisation s'entendra non seulement du point de vue technologique et économique mais comme genre de vie qui a comme premier corollaire l'urbanisation. Comme le dit Louis Wirth "l'urbanisation ne signifie pas seulement un processus par lequel les individus sont attirés dans un endroit appelé ville et incorporés dans son système de vie; le mot connote aussi les effets cumulatifs des caractères distinctifs de ce genre de vie qui est associé à la croissance des villes et finalement aux changements dans les genres de vie qui sont reconnus comme citadins; ce genre de vie se retrouve chez les peuples, où qu'ils se trouvent, qui sont sous le charme de l'influence que la ville exerce sur eux à travers les institutions et les personnalités dont les moyens de communication et de transport ont facilité la connaissance[2]." Si l'hypothèse de Becker était fondée, on constaterait que plus une société se sécularise plus son système de valeurs devient perméable, plus elle accepte l'idée de changement. Il faudra voir comment se vérifie cette hypothèse.

L'étude des processus d'urbanisation et de sécularisation dans le Québec ressemble par certains côtés à l'étude des processus d'acculturation. Si l'on distingue entre l'évolution culturelle autonome, c'est-à-dire entre le changement culturel qui s'accomplit strictement à l'intérieur d'une culture sans rien emprunter à d'autres cultures et celui qui s'accomplit sous

[1] Idéal n'est pas employé ici dans un sens normatif.
[2] Wirth, Louis. *Urbanization. Journal of American Sociology, July* 1938, p. 5.

la pression d'éléments extérieurs, il va sans dire que dans le Québec il s'agit autant d'acculturation que de sécularisation et d'urbanisation. Il est impossible de distinguer entre les phénomènes d'évolution autonome et ceux qui lui sont imposés par d'autres cultures. On peut poser en hypothèse qu'il y a une personnalité de base commune à tous les individus qui participent à la culture canadienne-française; cette personnalité est la résultante des expériences et de l'éducation communes à la majorité des individus qui forment la culture canadienne-française; pour qu'elle puisse être attribuée au citadin de Montréal et au pêcheur de l'Isle-Verte, il faut qu'elle soit construite de façon à inclure les caractères les plus généraux de cette culture. Ce que l'on pourrait donc appeler la culture nationale du Canada français serait un commun dénominateur, pour ainsi dire, de comportement et d'idées qui serait valable pour tous les segments socio-culturels. Comme dans le cas des phénomènes d'acculturation, il est bon de se rappeler que les effets de l'urbanisation et de la sécularisation ne sont pas uniformément distribués dans une population donnée, mais qu'il y a plutôt gradation.

L'île Verte est une petite île du Saint-Laurent, située à peu près à un mille de la rive sud du fleuve Saint-Laurent, en face des villages de l'Île-Verte et de Cacouna. Elle mesure environ 7 milles de longueur et $1\frac{1}{2}$ mille dans sa plus grande largeur. Certains documents laissent croire qu'elle a été habitée dès la fin du XVIII^{e} siècle; l'érection canonique date de 1874; en 1948, elle comptait 353 habitants. Au printemps et à l'automne, les habitants sont presque complètement isolés, à cause de la débâcle et du gel. L'été, on voyage en canot et en bateau de pêche et l'hiver sur "le pont de glace". C'est avec le village du même nom, situé sur la rive sud, que l'île a le plus de contacts. Pendant l'été et l'hiver les hommes traversent en général toutes les semaines; les femmes traversent beaucoup moins souvent; une femme,—son cas ressemble à un cas-limite,—n'a pas traversé le chenail qui sépare l'île de la rive, depuis plus de quinze ans. La population se compose de trois ou quatre grandes familles: Les Fraser,—de beaucoup les plus nombreux,—les Caron, les Lévesque et les Michaud forment plus des quatre cinquièmes de la population. Les premiers habitants de l'île, ceux dont la lignée continue encore aujourd'hui sont des Fraser; depuis trois ou quatre générations, ils ont abandonné la langue anglaise et la religion protestante et ne se distinguèrent plus du reste de la population. Le curé de l'île est le seul étranger qui demeure à l'île; tous les chefs de famille sont nés à l'île et il n'y a que trois femmes qui sont nées à l'extérieur. Les relations qu'ils entretiennent avec les gens de l'extérieur sont strictement d'affaires et se concentrent surtout dans le village de l'Isle-Verte, rive sud. Autant que l'on puisse juger, leur culture est demeurée assez statique pendant des dizaines et des dizaines d'années. Ce ne semble être que depuis la dernière Grande Guerre que des changements importants se sont accomplis et semblent devoir s'accomplir.

L'étude que nous avons faite en 1948 indique que la compréhension du "nous" est très restreinte dans l'espace ainsi que le temps. Le "nous" comprend d'abord les habitants actuels de l'île, la génération précédente, et

les autres à un degré moindre; quant à la notion de patrie, elle n'est pas très étendue non plus et c'est surtout l'île qu'elle comprend; on "saura bien" que la province de Québec existe, que le Canada existe mais cette connaissance ne semble pas avoir beaucoup de résonances émotives. La famille immédiate,—parents et enfants,—est l'institution qui joue le rôle le plus important et en fonction de laquelle se définissent les problèmes importants et autour de laquelle gravitent les sentiments. En dehors de la famille immédiate, les familles patronymiques ou même la famille indivise ne semblent pas jouer de rôle particulier. Il ne semble pas exister de clans strictement familiaux. Des cliques, des clans au sens large il en naît et il en meurt tous les jours; ils sont mobiles, pour ainsi dire, et se fondent plutôt sur l'intérêt du moment. A part les groupes dont la raison d'être est la politique provinciale et fédérale et où les mêmes adversaires se rencontrent à plusieurs occasions, les autres clans naissent à l'occasion d'une dispute au sujet de la route, des droits de grève, de l'emplacement des écoles, et sont très mobiles. Même la politique, qui divise le plus les gens, ne laisse pas beaucoup de trace de dissensions et de rancunes. N'étant que 300 à peu près, divisés en une quarantaine de ménages presque tous apparentés, la nécessité où ils sont de se voir souvent dissipe bien des malentendus. On peut noter d'autre part une certaine évolution dans la forme des familles: en 1940, 25 familles sur 41 étaient nucléaires et 16 indivises, alors qu'en 1912, 19 étaient nucléaires et 20 indivises. Il semble que ce léger changement dans la structure de la famille soit causé par les changements économiques qui, depuis la guerre de 1939-1945, ont été assez nombreux. Beaucoup plus de numéraire en circulation, lois sociales, allocations familiales, pension de vieillesse, embauchage intensif dans la province, tous ces facteurs ont eu pour effet de rendre les enfants plus indépendants des parents et leur a donné le goût et les moyens de fonder un foyer plus tôt qu'auparavant.

On remarque aussi plusieurs changements dans la technologie; si les agrès de pêches n'ont pas changé, il y a eu en revanche, depuis une dizaine d'années, une mécanisation croissante de l'agriculture et de la batterie de cuisine. On achète beaucoup plus chez les marchands qu'on le faisait il y a quinze ans à peine. En face de tous ces changements qui, envisagés à l'échelle de l'île, sont assez nombreux et assez importants, y a-t-il des états de résistance, y a-t-il une idéalisation du passé et des institutions qui évoluent! Il semble qu'il n'y ait d'idéalisation que pour les choses ou les états de choses qu'on sent être nettement différents de certaines autres auxquelles on peut les comparer. La seule idéalisation importante que nous ayons aperçue à l'île, c'est celle qui a trait à l'insularité même du village. Les gens diront volontiers que le climat est meilleur qu'ailleurs, que le fait d'habiter une île rend plus indépendant et plus tranquille. Il semble que cette idéalisation, et seulement celle-là, prend corps parce que les gens se rendent compte d'une différence avec l'habitat des autres personnes qu'ils fréquentent. Il va sans dire aussi qu'ils se rendent compte des inconvénients de leur insularité, surtout à l'automne et au printemps.

Quant à leur culture proprement dite ils n'ont pas tendance à l'idéaliser. Les différences qui existent entre les villages de la côte qu'ils fréquentent n'étant pas très grandes ou ne leur étant pas, du moins, très sensibles, ils ne peuvent concevoir qu'on puisse vivre différemment d'eux; la question ne se pose pas. Les descriptions que certains voyageurs et marins peuvent leur faire de différentes façons de vivre les laissent assez insensibles. C'est-à-dire qu'ils s'enthousiasmeront peut-être pour certains incidents des récits mais d'une façon tout à fait dégagée sans jamais penser que c'est d'un monde réel qu'il s'agit, d'un monde qu'ils pourraient habiter. Aussi étrange que cela paraisse, leurs réactions devant des récits de voyages ou devant la description de certains genres de vie différents du leur sont à peu près les mêmes que celles qu'ils éprouvent à l'audition des "Trois Mousquetaires" d'Alexandre Dumas, le seul conte, roman ou fiction que je leur aie entendu raconter spontanément. Même dans ce domaine on sent que la personne du narrateur qui avait une grande réputation d'aventurier et de fier-à-bras les prédisposait favorablement à l'écouter et à être émus. La même histoire racontée par un étranger ou vue au cinéma ne les eût certes pas autant attirés.

Ne pourrait-on pas dire que seuls les éléments dont ceux qui participent à une culture donnée sentent le caractère relatif et quelquefois l'infériorité sont susceptibles d'être idéalisés? C'est peut-être là une des raisons principales de la faillite des mouvements nationalistes dans le Québec rural. En effet, qu'est-ce qu'un nationalisme sinon une prise de conscience d'un groupe par rapport à d'autres groupes et une idéalisation de la culture de ce groupe. Avant qu'un groupe ne vienne activement en contact avec un autre groupe, il faut se demander s'il y a vraiment nationalisme, au sens moderne du terme. Et cela nous amène à parler de ce critère que Becker considère comme essentiellement caractéristique de la société sacrée: la résistance à la nouveauté. A-t-il tout à fait raison de faire de ce critère le critère essentiel des sociétés sacrées? Il est, d'une part, patent que la plupart des sociétés qu'il désigne comme sacrées changent très lentement et qu'elles sont en général statiques. Mais est-ce bien dû à un refus de changer ou n'est-ce pas plutôt un manque d'occasion de changer plutôt que le refus d'accepter le changement. Et même lorsqu'il y a changement, ne faudrait-il pas distinguer entre les différents secteurs où les changements s'opèrent? Les changements de la culture matérielle se font plus vite et presque sans difficulté. Les répercussions que ces changements provoquent dans les autres secteurs de la culture sont infiniment plus complexes et difficiles à juger. Ces changements s'effectuent beaucoup plus lentement parce que l'on se heurte à des phénomènes qui ont racine dans des couches plus profondes des institutions et de la personnalité et dont les individus sont souvent inconscients. Mais entretemps, c'est-à-dire entre l'adoption de certains traits de culture matérielle et les répercussions que ces emprunts produisent dans d'autres secteurs, se produit fréquemment un durcissement de la culture emprunteuse et c'est le passage du traditionalisme inconscient au traditionalisme conscient; ce refus de changer n'est que l'effet de ce nouveau traditionalisme.

Pour juger des changements dont une culture donnée est l'objet, il faut distinguer entre les changements qui sont l'effet des processus de diffusion, —emprunt d'une culture à une autre,—et ceux qui sont l'effet du principe de changement immanent; dans une société qui subit l'influence d'autres cultures, il est difficile de distinguer entre les deux sortes de changements. Envisagée sous l'aspect de "l'attitude envers le changement" et non plus en considérant les changements eux-mêmes, la question se pose différemment.

Une société peut accepter de changer soit en acceptant les éléments de certaines autres cultures, soit en évoluant d'une façon autonome, c'est-à-dire en développant les potentialités de sa culture. On peut très bien envisager le cas d'une société,—ce cas n'est pas simplement hypothétique et pourrait s'appliquer aux États-Unis,—très avancée du point de vue technique et très urbanisée et qui justement à cause de ces caractères aurait tendance à négliger les apports qu'elle pourrait recevoir de certaines autres sociétés moins avancées sur certains points précis mais qui pourraient offrir sur d'autres points des éléments plus avantageux. Il n'est pas sûr qu'il n'y a que la société sacrée, comme le dit Becker, qui ait un système de valeurs imperméable. Aux États-Unis, pour revenir à ce pays dont il vient d'être question, les transformations s'opèrent à un rythme très accéléré, mais il n'est pas sûr que ce soit leur système de valeurs même qui change. Les changements sont plutôt l'effet du principe immanent de changement sans que le système de valeurs soit perméable au sens où Becker prend ce mot.

Il ne semble pas que le refus de changer son système de valeurs soit exclusivement le fait des sociétés dites sacrées. C'est même quelquefois le contraire qui arrive. L'Île-Verte est partie du Québec qui lui-même est partie du Canada. Vue par rapport à cet ensemble, l'Île-Verte représente le cas d'un village isolé, d'une île où la culture est plus statique que presque partout ailleurs; le village de l'Isle-Verte sur la côte sud, Rivière-du-Loup, Québec, Montréal et Toronto ont évolué et continuent d'évoluer plus vite. Le traditionalisme des habitants est inconscient. Ce n'est pas au niveau de l'Île-Verte que le durcissement d'une société donnée,—en l'occurrence le Québec,—prend naissance. Il vient plutôt des initiateurs, des propagateurs du traditionalisme conscient, en l'espèce, des ministres de l'Église et des meneurs politiques et intellectuels dont certains actes et certaines idées sont eux-mêmes des réactions envers les modifications ou les tentatives de modifications qu'on essaie de faire subir à la culture dont ils sont membres. Un peu plus d'argent à l'Île-Verte et voilà la vieille culture matérielle qui graduellement est mise au rancart. Aucun attachement, sinon tout superficiel, envers ces instruments, ces matériaux dont on s'est servi pendant des générations. Le passage d'une économie de subsistance à une économie monétaire se fait sans heurt. Si quelquefois on hésite entre ces deux formes d'économie, ou plutôt entre certains de leurs aspects, ce n'est pas qu'on tienne plus à l'ancienne et que l'on refuse de changer; c'est qu'on ressent qu'en changeant, certains problèmes d'adaptation se posent. Ainsi le troc qui était encore la forme d'échange économique le plus en vigueur, il y a quinze ans à peine, a commencé de rétrograder. Certaines gens se rendent

compte qu'il est difficile de s'en défaire; les modèles culturels veulent qu'à un parent on ne demande pas d'argent pour des services rendus ou pour des biens de consommation mais des services et d'autres biens. On n'est toutefois pas sans se rendre compte que quelques-uns profitent de cet état de choses et qu'ils profitent du troc pour rendre moins qu'ils ne reçoivent[1]. On soutient, d'autre part, que ces faits sont récents et qu'une telle chose ne se fût jamais présentée dans le passé. Les individus qui envisagent ce problème,—le passage du troc à l'économie monétaire,—n'en soutiennent pas moins que l'ancienne forme devrait être définitivement abandonnée.

D'autre part, la pratique de la littérature orale dont Redfield fait une caractéristique de sa folk-société a une tendance marquée à regresser. Non pas tant pour être remplacée par la littérature écrite que par d'autres formes d'amusements. Les jeunes gens sont plutôt indifférents envers cette littérature orale. Quelques-uns même manifestent de l'impatience envers ceux qui s'y intéressent encore. Même chez les plus vieux, on ne refuse pas de changer, on chante autre chose. Il y a en somme beaucoup plus d'attachement conscient envers cette littérature dans certaines sphères urbaines de la société canadienne que chez les habitants de l'Île-Verte eux-mêmes.

Les relations sociales évoluent; on ne prend plus autant de plaisir aux rencontres et aux veillées de toutes sortes. Les loisirs ont beaucoup diminué; le standard de vie augmentant, le travail s'est fait plus pressant et plus long. L'agriculture gagne des adeptes; la mer seule ne suffit plus à faire vivre son homme. Tous ces changements s'opèrent à un rythme assez accéléré. Peut-on dire que leur système de valeurs change? Pour répondre à cette question il faut d'abord examiner le rôle de la religion dans la société de l'Île-Verte. Là, comme ailleurs, il y a évolution. Si la religion joue, à coup sûr, un grand rôle dans la vie des insulaires, il s'en faut toutefois de beaucoup que les comportements spécifiquement religieux directement observables soient aussi nombreux que l'importance de la religion dans leur vie le laisserait supposer; la religion se manifeste plutôt à un niveau plus profond, dans la structure de leur mentalité, dans leurs attitudes et leurs émotions.

La visite des maisons renseignerait vite quiconque ignorerait tout des insulaires: crucifix, croix de tempérance, images religieuses de toutes formes et de toutes couleurs sont suspendus aux murs. L'église, située au milieu du village, attire tout de suite les regards. Le côté extérieur de la religion est presque tout entier accaparé par la messe du dimanche qui est la seule manifestation collective de la semaine. "Ils ont une piété qui me plaît, disait le curé; rien d'exagéré ni de bigot mais quelque chose de solide qui vient d'une foi sans sentimentalité et qui est profondément ancrée chez eux." Pendant les quelque dix semaines que nous avons passé à l'Île-Verte il nous fut donné assez rarement d'entendre prononcer le nom de Dieu ou de

[1] Il est intéressant de noter ici que les principes sur lesquels s'appuient le don considéré comme forme archaïque de l'échange et le commerce, d'autre part, sont différents. Alors que le don, comme Mauss l'a bien vu,—et le troc à un degré moindre,—fait appel aux sentiments d'honneur des individus et qu'il sert à l'acquisition du prestige, le commerce est fondé sur l'intérêt personnel: il faut recevoir le plus possible et donner le moins possible. Dans des formes plus primitives de l'échange, ce qui importe c'est de pouvoir donner beaucoup, plus qu'on a reçu ordinairement, afin d'acquérir le plus de prestige possible. Certaines de ces formes persistent encore dans la société occidentale contemporaine: les réceptions mondaines par exemple.

choses religieuses. Les quelques fois que Dieu et la religion furent mentionnés, il s'agissait de guérisons miraculeuses et de l'action de Dieu sur toutes choses. C'est lui qui a fait disparaître la mousse de mer dont ils ont longtemps vécu, qui donne plus de poissons au voisin, qui fait venir l'eau dans les puits desséchés. Ce sont surtout les femmes qui émettent ces opinions. Il y a toutefois une exception à noter et que je mentionne parce que le comportement religieux atypique de cette personne pourrait bien se relier à d'autres particularités de son état. Cette personne présente du point de vue fortune et statut social quelque différence avec ses concitoyens. Alors que les insulaires sont des pêcheurs et des cultivateurs de fortune modeste, cette personne est de condition plus considérable. Veuve d'un officier de marine, sa maison est plus confortable et sa fortune plus apparente. Elle a fait instruire ses enfants dans les couvents et les collèges secondaires et a toujours entretenu des relations avec les curés de la paroisse. C'est la seule personne à faire montre de tous ces caractères et à manifester d'autre part un comportement religieux atypique. Alors que les autres personnes ne parleront jamais ou presque jamais de Dieu, de l'église, du curé, cette personne, au contraire, parle très volontiers de religion, à la manière de bonnefemmes de village: "Il faut tout accepter de Dieu. Dieu nous aidera. M. le curé est un saint; il pourrait faire des miracles. Si X n'a pas plus de poissons c'est que Dieu le punit de ses péchés." Alors que les comportements des insulaires semblent compartimentés et que la religion semble nicher dans un secteur très peu accessible de leur personnalité, les conversations de cette personne en sont remplies et sa personnalité semble plus intégrée. Pour faire parler un insulaire de religion il faut ordinairement employer toutes sortes de ruses et encore n'en parle-t-il pas beaucoup. Il semble que ce soit quelque chose qui soit entièrement entre les mains du curé et que les paroissiens n'aient pas du tout à s'en préoccuper. Plus fortunée que les autres, frottée d'instruction par l'entremise de ses enfants, admise dans la compagnie des curés, cette personne se sent pour ainsi dire des droits sur Dieu et la religion.

Cet exemple, et d'autres plus nombreux que je pourrais tirer de l'étude de la société païenne des Iroquois de Brantford[1] et de celle de Laval dans le Québec montre d'abord qu'à un certain niveau les modèles culturels peuvent être homogènes sans que sur le plan conscient de la personnalité cette homogénéité soit manifeste. Les principes d'intégration ne sont pas explicités, ne sont pas énoncés et les comportements verbaux des individus donnent l'impression d'une personnalité compartimentée. A l'Île-Verte, cette compartimentation se fait surtout sentir dans les domaines du sacré[2] et du profane. Il semble que ces deux secteurs soient parfaitement indépendants; les individus ne semblent pas avoir conscience du rôle prépondérant que joue la religion dans leurs façons de vivre et de se comporter. Il semblerait donc que l'évolution des sociétés même sur le plan restreint où nous sommes placés n'est pas linéaire. L'explicitation des principes intégra-

[1] Rioux, Marcel. *Religion and government among the Six Nations Iroquois of Grand River, Ont. Annual Report of the National Museum, no. 126, 1952, pp. 94-98.*

[2] Sacré est employé ici dans le sens que l'école durkheimienne donne à ce terme; il équivaut *grosso modo* à religieux.

teurs rend les personnalités plus intégrées. Cette prise de conscience fait naître à son tour ce refus de changer qui n'est certes pas primaire mais bien l'effet d'une réaction.

Dans quel sens le village de l'Île-Verte évolue-t-il? Nous n'essaierons pas de discerner les transformations qui sont l'effet de la diffusion de traits culturels américains et anglo-canadiens de celles qui résultent du principe immanent de changement (à l'échelle du Canada français et plus spécialement de l'Île-Verte). Il semble justement que le plus grand changement qui se soit opéré depuis un quart de siècle et plus spécialement depuis la dernière guerre soit justement l'acceptation de l'idée de changement, de progrès. C'est une nouvelle disposition d'esprit, favorable au changement et qui déplace vers l'avenir l'âge d'or qu'inconsciemment ils fixaient auparavant dans le passé. A ce premier stade, le déplacement du temps de l'âge d'or reste encore largement non-énoncé. Les changements qui se sont produits à l'Île-Verte ont eu comme point de départ les améliorations économiques que les mesures de sécurité, l'embauchage accru et la relative prospérité économique de la guerre et de l'après-guerre ont apportées au continent nord-américain. Ces changements sont d'abord visibles au niveau de la culture matérielle; achats plus considérables de produits de consommation: laveuses et pétrins mécaniques, cuisinières nickelées; on quitte définitivement les vêtements fabriqués à l'Île-Verte; même phénomène pour l'alimentation; beaucoup plus de produits achetés, moins de frugalité; le poisson et la pomme de terre restent la base de leur alimentation mais on y ajoute beaucoup de produits commerciaux qui, il y a à peine dix ans, n'apparaissaient pas sur leur table. On a acquis un goût certain pour ces aliments. L'agriculture se mécanise progressivement; du jour au lendemain, on a remplacé les bœufs de trait par des chevaux. Une automobile circule dans l'île depuis quelques années déjà; les dimanches et les jours de fête, l'automobile n'a aucun répit.

Même si ces changements se sont surtout opérés dans la culture matérielle, il n'en reste pas moins que d'autres sont perceptibles au niveau de la culture sociale et idéologique; ces derniers ne sont probablement que les effets des premiers. Comme les conditions d'embauchage et les conditions générales de l'économie sont plus favorables qu'elles ne l'étaient avant la guerre, les enfants ont tendance à quitter l'île plus jeunes et la famille est d'autant plus désorganisée. Ceux des enfants qui restent à l'île sont moins nombreux; pouvant gagner leur vie plus facilement, ils se souviennent moins de l'héritage que leurs parents peuvent leur faire. Ainsi, certains liens, basés sur la dépendance économique des enfants vis-à-vis des parents, se relâchent. La courbe des naissances reste ferme bien que, à cause de l'exode accru, la population ait tendance à diminuer quelque peu. Le respect du vieil âge reste grand quoique les conflits entre générations augmentent.

Quant à la culture idéologique, le seul changement important qui soit clairement perceptible, c'est l'acceptation, inconsciente souvent, de l'idée de changement et de progrès, acceptation qui se traduit par un manque d'idéalisation du passé. Le décalage qui existe entre les comportements et les modèles culturels augmente et les individus sont souvent conscients de cet état de choses.

Au cours de cette enquête que je conduisis en 1948 pour le compte du Musée national, cinquante tests Rorschach furent administrés par Madame Claire Mathieu-Fortin dont voici quelques extraits du rapport. "L'aspect le plus frappant de leur personnalité, c'est le besoin inconscient qu'ils ont de contacts humains et de rapprochement. Ils sont en un sens extrêmement dépendants les uns des autres et manifestent beaucoup d'esprit communautaire. Bien qu'ils fassent montre, d'une part, d'attitudes indépendantes et individualistes, ils sont d'autre part enclins à compter sur la société comme sur une forteresse . . ." Il est assez curieux de constater que des huit personnes qui manifestent certains traits de paranoïaque et de névrose, toutes ont été soumises à des influences extérieures et ils ont encore ceci de commun qu'ils sont conscients de l'état de leur personnalité. "On trouve chez ces personnes une anxiété d'un type particulier, une anxiété intellectualisée et dépersonnalisée. Deux individus marquants de ce groupe sont des hommes d'âge mûr qui ont voyagé tous les deux et vu d'autres pays,—l'un comme capitaine de navire,—et qui présente une frappe similarité de réaction. Ils sont plus égotistes et introvertis que les autres; ils sont conscients de leur agitation intérieure et de leur état d'incertitude et ils éprouvent un très fort besoin d'affection et d'approbation. La seule personne qui soit née en dehors de l'Île-Verte à passer un test Rorschach présente certains caractères atypiques, elle est beaucoup plus extrovertie que les autres et manifeste quelques tendances à l'hystérie. Et enfin la psychologue conclut: Comme groupe, les habitants de l'Île-Verte manifestent les signes de conflit et de tension intérieure . . . des signes d'opposition entre eux[1]."

En termes durkheimiens, les constatations de cette spécialiste indiquent que déjà, sinon en termes d'activités sociales et économiques,—il n'y a que très peu de division sociale du travail à l'Île-Verte,—on est passé de la solidarité mécanique à la solidarité organique, c'est-à-dire que la conscience individuelle ne s'identifie plus à la conscience collective.

---

[1] Mathieu-Fortin, Claire. *Personality appraisal of the people of Isle-Verte by means of the Rorschach method.* MSS. 1949.

LE CARNAVAL-CARÊME EN GASPÉSIE

Par Carmen Roy

Le cycle de Carnaval-Carême se manifeste sous un aspect qui le différencie des autres cycles de l'année. Il se distingue par une certaine licence des mœurs, par une suppression des exigences de la vie normale, caractérisées par un abandon à la liberté alimentaire, par des festins et des danses, par des travestissements, des quêtes et des cortèges.

Indépendante de l'organisation civile ou religieuse, s'affirme l'importance accordée par le peuple à la "veille" ou vigile, ainsi qu'à la prolongation, voire même au redoublement ou anniversaire de certaines cérémonies populaires. C'est ainsi que le cycle Carnaval-Carême a son étape préparatoire, ou liminaire, à laquelle correspondent les réjouissances du Carnaval, et son redoublement à la Mi-Carême et à Pâques.

Morphologiquement, la période du Carnaval en Gaspésie, ne comprend que les trois Jours Gras (dimanche, lundi et mardi). Par extension, à cause de certaines exigences de la vie sporadique, la période comprise entre le temps des Fêtes et celui du Carême a autrefois donné lieu à des réjouissances ininterrompues. Ce fait tient à ce que les travaux de la terre et de la pêche retenaient la population à la tâche de façon telle qu'aucune célébration prolongée n'eut été possible à l'occasion d'un mariage. D'autre part, la pauvreté qui sévissait dans la région imposait à la population le régime du poisson pendant toute la saison de la pêche. Or, pour obvier à ces inconvénients, il était donc généralement d'usage de remettre les mariages à la période du Carnaval, alors que les chasseurs renforçaient les provisions de viande acquises au temps des boucheries, un peu avant les Fêtes. Mais petit à petit, les conditions de vie s'améliorant, le Carnaval ne se célébra plus que durant les Jours Gras.

A cette occasion, tous les hameaux étaient en liesse et les habitants convoqués d'une danse à un repas et d'un repas à une danse, trois fois par jour. Des agapes collectives, préparées par un hôte différent à chaque année, réunissaient les villageois dans une maison. Aussi, le Lundi Gras, passait-on de porte en porte pour recueillir les victuailles requises à la célébration. Ces quêtes, nullement considérées comme une sorte de mendicité, revêtaient plutôt le caractère actif et généreux d'un devoir agréable à remplir. Et ce festin clôturait ces trois jours de bombance et de danses auxquelles on se livrait avant l'entrée du "Carême-noir" ("Carnes toltas": viandes ôtées). Quelques très rares informateurs nous apprennent cependant qu'il était alors d'usage de saluer l'arrivée du Carême en mangeant des crêpes cuites sur la plaque (appelées "crêpes à la guenille") au cours de la soirée du Mardi Gras. D'autres informateurs nous parlent d'une coutume qu'on eût pu associer à ces farces fréquentes dans la région de la Marne, par exemple, alors qu'il convenait de parodier, ce jour-là, des faits comiques ou scandaleux survenus au cours de l'année. Ils nous révèlent la présence, dans le cortège, du "poêle à brûler les savates" que nous pourrions comparer au "poêle à brûler les sangsues", si nous n'avions découvert que cette parodie

se détachait de ces fêtes cycliques pour s'attacher aux plaisanteries d'un charivari coïncidant avec le jour du Mardi Gras. Ce feu de "savates" se réclamait donc du ridicule dont on qualifiait l'union tardive d'un veuf ou d'une veuve à une jeune fille ou à un jeune homme.

Quant aux déguisements, soixante pour cent de nos informateurs,—en majeure partie de la baie des Chaleurs,—soutiennent qu'il y a quarante ans, tout comme dans beaucoup de villes du Midi de la France, ils n'eurent lieu qu'à la Mi-Carême. Tous sont cependant du même avis pour accorder au Mardi Gras un caractère de réjouissance, d'ivresse, de délire que n'a jamais revêtu la Mi-Carême uniquement préoccupée de travestissements et d'"écôt de tire". Or, si le comté de Bonaventure ne confère qu'à la Mi-Carême les privilèges du déguisement d'autrefois, un autre point le tient en marge des comportements des comtés de Gaspé-Nord et de Gaspé-Sud. Et c'est précisément sur la question du travestissement de la Mi-Carême.

Dans cette région de la baie des Chaleurs, une seule personne,—du sexe fort,—symbolisait la Mi-Carême. On choisissait cependant une Mi-Carême à chacune des deux extrémités du village et, sur un traîneau, on la promenait à travers toutes les rues. Ce qui donnait lieu à des batailles simulées avec coups de bâton, de grands cris et beaucoup de bruit, lorsque les deux Mi-Carêmes, accompagnées de leur cortège, se rencontraient. Quand ces démonstrations s'étaient prolongées assez longtemps dans la rue, on entrait dans les maisons pour quêter du sucre et pour présenter la Mi-Carême à ceux qui n'avaient pu participer à la fête extérieure, et l'on clôturait la soirée en cuisant et en mangeant de la tire.

A la limite du comté de Bonaventure, en circonscrivant la péninsule en direction de Gaspé-Nord, on se costumait en groupes. Nous n'avons pu rencontrer un seul témoin de ce personnage central ci-haut mentionné.

Ce phénomène ne manque pas d'intérêt, puisque les personnifications les plus primitives sont celles où la période cérémonielle est représentée par un être vivant. Elles sont devenues très rares en France parce que des accidents graves ont entraîné la suppression de la coutume. A ce personnage vivant, l'on a substitué le mannequin de paille. De ce mannequin, nous ne remarquons la présence en Gaspésie qu'à l'occasion des campagnes électorales, alors que pour marquer ses vindictes personnelles, on brûlait et l'on brûle encore ce mannequin représentatif au milieu de démonstrations spectaculaires.

Le mannequin vivant, qui symbolisait la Mi-Carême dans la région de la baie des Chaleurs, était d'abord revêtu de haillons. Puis on l'enduisait de mélasse de la tête aux pieds et on le roulait dans la plume. Ou encore, on le revêtait d'une peau d'ours ménagée à cette intention, c'est-à-dire sur laquelle on avait laissé la peau de la tête et les griffes aux pattes. Cette survivance d'un motif folklorique formé presque uniquement dans les Pyrénées et dans les Alpes françaises (localisé dans les Pyrénées) pourrait laisser tout simplement supposer que ce sont les thèmes racontés (conte de Jean-de-l'Ours, de la Belle et la Bête, etc.) ou le culte de la chasse qui aient inspiré de tels déguisements aux Gaspésiens. A moins que, dès ce temps-là, ait déjà existé le premier "théâtre" ambulant en Gaspésie, monté

par un dompteur d'ours étranger qui "faisait danser l'ours" aux acclamations de toute la population de notre littoral. Parodier cet événement à l'occasion de la Mi-Carême nous semble traduire aussi une plausible interprétation. Car il serait osé de faire ici allusion à quelque survivance préhistorique, puisque même devant l'incinération du mannequin, ou devant la parodie de l'enterrement du mannequin vivant qui, en 1900, avaient encore lieu en France, on n'évoqua ni mythes, ni symboles divins. On conclut, avec Frazer, que "La personnification d'une période de temps est trop abstraite pour être primitive".

Or, comme nous le mentionnions plus haut, depuis une quarantaine d'années, ce personnage central a été remplacé par les groupes d'individus costumés qu'avaient toujours connus Gaspé-Nord et Gaspé-Sud. Et la coutume a gardé son homogénéité depuis, bien qu'ayant subi une légère régression. Car ces déguisements brutaux et ces apparitions sensationnelles ont poussé les autorités religieuses à interdire ces démonstrations qui causaient ici des syncopes chez les vieillards, là des évanouissements ou des avortements chez les femmes enceintes, ou des ébranlements du système nerveux chez les enfants que les masques effrayaient.

C'est ainsi que les déguisements en animaux ont peu à peu perdu leurs caractères dramatiques. De la peau d'ours ou du travesti de plumes employés comme costume, on n'a conservé que le masque confectionné de la peau des ours, des orignaux, des bœufs, des lièvres, des moutons, des chiens, des chats, continuant toujours cependant à s'enduire le visage de mélasse recouverte de duvet ou de plumes. Et l'on a fini par prendre plaisir à inverser les sexes dans les déguisements; on ne manquait pas alors de faire au charbon des barbes copieuses sur les visages féminins. Et ce pendant que les gros ventres traduisaient chez les déguisés une allusion à la liberté alimentaire à l'ordre du jour, d'autres symbolisaient la maigreur du carême en s'affublant d'airs pitoyables; on enlevait ses râteliers, on s'improvisait des rides au visage et un teint blafard digne du Carême-noir. D'autre part, comme le meilleur moyen de se modifier pour des Blancs est de changer la teinte de leur peau, les noircissements ont toujours été à l'honneur, ainsi, les Australiens, dans leurs cérémonies totémiques de l'Afrique, s'enduisaient le corps de terre blanche, de plâtre ou de chaux. On s'est aussi servi, et on se sert encore, de l'écorce du bouleau dans la confection des masques, de mousse d'érable pour les barbes postiches, et de pattes de homards pour l'application des nez. La présence de quelques masques en bois (mufle de cochon, etc.) nous a aussi été signalée.

Ces heures de déguisement constituent une des parties amusantes de la soirée. Elles donnent lieu à des bouffonneries, à des contorsions théâtrales qui provoquent l'hilarité générale. Et c'est sur ce ton de bonne humeur émaillée de toutes les facéties, qu'armé d'un bâton, l'on prend la route. Gare à qui tentera,—et on l'osera,—d'assaillir, de démasquer ou de lapider ces personnages devenus des hors-la-loi pour qui l'insulte devient la dernière permission attendue pour donner libre cours à leurs instincts les plus grossiers, les plus crapuleux. Car si l'heure du déguisement a ouvert les portes à l'émergence de certains actes désordonnés, l'heure du défilé invite les

masques à rivaliser de fantaisie et de cocasserie. La rencontre d'un autre groupe de Mi-Carême ne s'effectue généralement pas sans donner lieu à des batailles spectaculaires. Aussi, le matin du Mercredi des Cendres, pouvons-nous voir, en bordure des routes, des oripeaux, de vieilles nippes, du sang, des bouts de bâton cassé.

Chaque groupe de masques a son chef attitré. Celui-ci précède sa bande dans les maisons où il veut obtenir la permission d'entrer. Les hôtes, partagés entre la curiosité de recevoir ces boute-en-train, l'appréhension de leurs fanfaronnades possibles et le désir de s'intégrer à ce plaisir collectif, acceptent toujours ces visiteurs du soir. On les prie d'être gentils et de danser sur la musique du joueur d'harmonica qui les accompagne. Encore faut-il qu'ils le fassent avec art pour recevoir le sucre et la mélasse que, d'une voix criarde et déformée, les déguisés demandent à leurs hôtes. Quoique d'autre part, sur la moindre menace du groupe, personne ne leur opposera un refus, par crainte des représailles. Car les Gaspésiens, disons plutôt les Gaspésiennes, n'ont jamais lutté de hardiesse avec ces personnages quasi légendaires, marquées de l'expérience que leur ont infligée, dès les débuts de la colonie, des "quêteux" qui "jetaient des sorts" à quiconque leur refusait le gîte ou le couvert. Aussi, offre-t-on généreusement sucre et mélasse aux déguisés qui vont clôturer la soirée par le traditionnel "écôt de tire" dans une maison attitrée à chaque bande. Après avoir bu, mangé, chanté et dansé, l'on se quitte sur les accents de la chanson:

> Adieu, le carême s'en va,
> On mangera p'u' de soupe aux pois.

Les villages recouvrent leur calme jusqu'à Pâques, alors que les enfants se travestissent en Pâquots, quémandant des bonbons et des sous. Il y a une quarantaine d'années, cependant, ils recevaient des cœurs de sucre d'érable ou des œufs peinturlurés d'une teinture rouge exprimant les souhaits de Joyeuses Pâques des donateurs. De nos jours, les Pâquots se font plus rares, et les enfants, qui ne savent plus chanter "La Passion de Jésus-Christ, qu'elle est triste et dolente", prennent davantage prétexte du Mardi Gras et de la Mi-Carême pour se déguiser et quêter le sucre.

Toutes ces personnifications, bien que moins largement réalisées, survivent en Gaspésie et, il y a tout lieu de croire que cette période de licence traditionnelle trouvera longtemps encore son écho dans le cœur d'une population limitée dans l'extériorisation de ses tendances à la dramatisation et dans l'épanouissement de son légitime désir de rompre avec l'austérité d'une région coincée entre la montagne et la mer.

MOTS ET CHOSES D'ACADIE

Par Luc Lacourcière
et Félix-Antoine Savard

Notre enquête de 1951 s'est continuée au nord du Nouveau-Brunswick. Grâce à l'aide du Musée national d'Ottawa, nous estimons y avoir fait un bon butin de contes, de chansons et de faits folkloriques de toute espèce. Si les îles de Shippigan et de Miscou ont été, comme l'an dernier, l'aire principale de nos recherches, nous avons, cependant, commencé des sondages dans la partie continentale de cette région, c'est-à-dire à Shippigan même, à Pokemouche, à Inkerman, à Caraquet et à Tracadie.

Cette superficie demeure encore assez restreinte, il est vrai, mais le travail persévérant et minutieux que nous avons voulu faire en profondeur, grâce à des séjours prolongés et nombreux, se justifie, croyons-nous, par les exigences scientifiques fondamentales de l'anthropologie.

L'enquêteur de passage ou d'occasion doit se contenter de suivre les sentiers déjà battus, ou bien de n'écumer que le superficiel et le plus fréquent, c'est-à-dire le produit éphémère des engouements et des modes. La fortune de certaines chansons mises en vogue par la radio nous en dit assez sur ce point. Cette musique peut être le fait de toute une collectivité. Il n'en reste pas moins qu'elle est l'expression non de la tradition profonde, mais tout au plus de l'efficacité générale et rapide des moyens modernes de vulgarisation. Elle ne révèle à peu près rien de ce que le folkloriste doit chercher.

Les trésors de la vie traditionnelle sont, il faut l'avouer, d'un accès de plus en plus difficile. Notre civilisation d'aujourd'hui recouvre d'alluvions assez épaisses des phénomènes, littérature orale, par exemple, qui affleuraient hier, partout, dans toutes les circonstances de la vie habituelle. Ce qui, autrefois, était dans les mœurs générales, et qu'on pouvait apprendre de toutes les bouches, est devenu exceptionnel. A preuve, encore, la chanson de tradition qui ne se retrouve à peu près plus que chez les vieillards et dans la partie la plus ancienne et la moins prompte de leur mémoire.

A ces difficultés auxquelles se heurte de plus en plus le folkloriste, s'ajoutait, dans notre cas, une certaine méfiance traditionnelle du peuple acadien pour "l'étranger". Nos premières enquêtes furent, de ce fait, assez déconcertantes. Par contre, nous pouvons affirmer aujourd'hui que ce qui nous sembla assez pauvre en 1950, s'avéra, en 1951, très riche et très varié en traditions de toute nature.

Nous maintenons donc le principe de l'avantage des séjours longs et répétés dans une région précise. Ces séjours permettent de faire à la longue ce que nous pourrions appeler le climat de la recherche. Ce climat provoque la collaboration. Mais il est un produit de la confiance. Il suppose un long commerce, un contact intime. Il s'obtient, mais à la condition de se dépouiller soi-même de tout préjugé, de partager la vie populaire, de se fondre pour ainsi dire en elle jusqu'à l'effacement complet de toute

caractéristique étrangère. Le folkloriste ainsi reçu dans la communauté, devient curieux de toute la vie populaire. Elle se révèle alors comme spontanément et dans toute sa riche complexité.

Dans cette diversité de l'objet folklorique, la langue occupe une place de choix. Elle est, en effet, le premier signe des pensées et des sentiments, le premier moyen d'expression de la vie individuelle et collective. Elle donne accès au génie d'un groupe racial, à ses origines, à la profondeur de sa tradition.

A chaque pas, au cours de ses recherches sur le terrain, l'enquêteur se trouve en face de problèmes linguistiques: provincialismes, mots inconnus relevant de techniques particulières, acceptions sémantiques et prononciations différentes.

Aussi quelques folkloristes n'ont pas tardé à reconnaître l'importance de la langue dans la science des traditions. En 1902, Gilliéron et Edmont publient le premier atlas linguistique. Cet exemple devait susciter des émules et orienter des travaux parallèles. C'est ainsi qu'un Monseigneur Pierre Gardette, recteur des Facultés catholiques de Lyon, grâce à la collaboration de toute une équipe, a élevé un véritable monument au parler de son lyonnais.

Les liens du folklore et de la linguistique sont donc, en théorie du moins, reconnus aujourd'hui par les plus grands. Arnold Van Gennep écrit, dans son *Manuel de folklore français contemporain:*

> "D'autres sciences, encore liées entre elles au début du XX^{e} siècle, et qui auraient pu servir à constituer le folklore intégral, ont acquis avant lui une autonomie telle qu'on est obligé de les laisser séparées. La linguistique, par exemple, devrait nous appartenir tout entière, tant comme phonétique, morphologie et syntaxe, que surtout comme sémantique, puisqu'il s'agit de phénomènes collectifs populaires. Plusieurs écoles de linguistes ont senti le lien interne entre leur science et la nôtre, ceux d'abord qui s'occupent du changement de sens des mots, mais aussi ceux qui s'occupent des rapports entre les mots et les choses: enfin, plus récemment, ceux qui étudient les noms propres, sous leurs deux formes, les noms de lieux (toponymie) et les noms de personnes (anthroponymie). Le premier Congrès international, tenu à Paris en 1938 (Bibliographie N^{os} 6533 à 6546), a été très affirmatif sur ce point. On doit ajouter que certains linguistes ont regardé la linguistique comme une partie de la sociologie, ce qui revient à la rendre au folklore[1]."

Marcel Maget dans *Quelques aspects de l'enquête ethnographique* ne pense pas autrement. Après avoir parlé des activités que doit observer l'ethnographie, il en vient aux "comportements linguistiques qui sont, eux aussi, dit-il, l'objet d'une description, voire d'un enregistrement précis. Là encore, beaucoup d'observations, qui à l'origine ont pu passer pour futiles, se sont révélées, ultérieurement, d'un grand pouvoir discriminant, comme l'ont montré les travaux de la linguistique, la première parmi les sciences humaines. Cette discipline a su établir une méthode et reste un modèle. Elle a de très bonne heure reconnu l'importance d'une notation des nuances, tant en morphologie qu'en sémantique. Elle a passé le cap des généralisa-

[1] Van Gennep, Arnold. Manuel de folklore français contemporain, Tome I, Introduction générale et première partie: Du berceau à la tombe. Paris, Éditions Auguste Picard, 1943, pp. 11 et 12.

tions hâtives et superficielles (cf. les fausses étymologies). A l'aide d'un matériel documentaire rendu de plus en plus précis par la notation phonétique et les enregistrements sonores, elle a recherché d'abord des comparaisons valables, puis les phénomènes de structure (cf. les travaux de phonologie)[1]."

Au Canada, on connaît l'attention toute spéciale que M. Marius Barbeau a accordée à l'étude des langues indiennes, du Huron-Iroquois en particulier.

Quant à nous, nous n'avons cessé d'accorder la plus vive attention à la linguistique; et ce butin, accumulé depuis plusieurs années déjà, nous est de la plus grande utilité dans le travail de lexicographie que poursuit la Société du Parler français.

Ce sont ces rapports du folklore et de la langue populaire que nous voudrions illustrer ici par quelques exemples. On sait l'importance des métiers traditionnels, et combien ils sont révélateurs de particularités ethniques. Nous avons choisi quelques termes de l'un de ces métiers, la pêche au homard, pour montrer la richesse verbale qu'ils contiennent, les problèmes de tradition, d'invention, d'assimilation qu'ils soulèvent et qu'ils éclairent aussi.

Aujourd'hui pour la pêche aux homards telle que nous l'avons vu pratiquer dans la baie des Chaleurs, on se sert de *trappes* ou *attrapes* à trois *baux* et à cinq filets. Autrefois, lorsque *l'homard* était plus abondant sur les côtes, on employait des procédés plus simples, le bâton par exemple. Le chanoine Victor Huard, dans *Labrador et Anticosti* décrit une pêche au bâton, à la Pointe-aux-Esquimaux, en 1896.

Il y a 50 ou 60 ans, à Shippigan, on utilisait à peu près exclusivement le *carrelet* ou la *salebarde*. Cet engin était relié à une bouée flottante par une longue corde, la *hallope*. On ne pêche plus guère avec le carrelet aujourd'hui. C'est un procédé abandonné parce qu'il requiert la présence constante du pêcheur. Tout au plus, durant la saison interdite, est-il encore employé par quelques braconniers de la mer.

Les *trappes* dont on se sert communément aujourd'hui sont fabriquées par les pêcheurs eux-mêmes. Il faut une journée de travail pour construire et *brocher* une trappe. On le fait pendant la morte-saison, en hiver et au début du printemps. Cette trappe est une sorte de cage en bois. Le bâti ou la base, qui frotte sur les roches au fond de l'eau, est un cadre rectangulaire d'à peu près 30 pouces de longueur sur 22 de largeur. Ce cadre est formé par des *palans* ou pièces longitudinales, et par des *travers*. Deux pierres plates placées entre les travers servent de *cale*. Trois baux ou pièces recourbées en demi-cercle sont ensuite fixés sur le bâti. Ces baux sont recouverts de lattes à claire-voie, et par endroits, de filets. Les deux filets aux deux extrémités de la cage portent le nom de *blinettes*. Deux autres, en forme d'entonnoir, permettent l'entrée du homard vers l'appât de hareng, la *bouette*, fixée sur une *pine* ou tige de bois. Le dernier filet ou grand net

---

[1] Maget, Marcel. Quelques aspects de l'enquête ethnographique. Édition du Musée gaumais, Virton, Extrait du "Pays gaumais", 11e année, 1950, p. 9.

sépare la cage en deux compartiments: le petit bord où entre le homard, le grand bord où il se réfugie après avoir mangé. Ce dernier compartiment où le homard demeure prisonnier est appelé, par ironie, le *salon*.

Chaque pêcheur possède plusieurs douzaines de trappes qu'il tend au large jusqu'à un mille des côtes. Au retour de la pêche à la morue qui se fait beaucoup plus loin, en mer, le pêcheur arrête son *botte* au-dessus de ses trappes. Cet endroit est reconnu facilement, grâce à des alignements ou *amers* qui lui sont personnels, grâce surtout aux *espars* auxquels sont attachées les extrémités de la *trâle*. Cette trâle est un maître-cable ou *amarre* de 60 à 100 pieds de longueur, tenu en flot à un bout, par une *bouée* ou *tangon*, à l'autre, par un *espar*. Les trappes sont reliées de six en six pieds à cette trâle par des *hallopes*. Au sommet de l'*espar*, et bien en vue, est fixée la marque de propriété: planchettes disposées en croix, en triangle, en losange, branches de sapin, plaques de métal, fanions de toutes couleurs. Chaque pêcheur conserve jalousement son enseigne de trâle.

Le travail est dur de lever, *manigots* en mains, une trâle de 25 à 30 trappes, de les haler l'une après l'autre dans le *botte*, de les *bouetter*, de les jeter à la mer, surtout à la fin d'une longue journée où l'on a pêché la morue par tous les temps, et depuis la première *barre du jour*.

Quand la courte saison du homard est close, trâles, trappes et espars sont ramenés à terre. Leur rôle, pour de longs mois, n'est plus que d'être, parmi les filets, les *échampeaux*, les *vigneaux* ou *chafauds*, les *virevaux*, les *quillics* et les barques, les témoins des inlassables et courageux pêcheurs des petits ports de l'Acadie française.

Amers (s.m.) Points de repère sur le rivage. Souvent prononcé amets.
Les clochers de Saint-Raphaël-sur-Mer sont des "amets".

Attrape ou ***Trappe*** (s.f.) Cage de bois et de filet servant à pêcher le homard.
Étym.—Substantif de *attraper*.

Bau (s.m.) Pièce de bois dont la courbure en demi-cercle donne son gabarit à la trappe à homards.
Étym.—*Bau*, terme de marine.

Blinette (s.f.) Filet sans issue. Une trappe à homards comprend cinq filets dont deux blinettes.
Étym.—Anglais, *blind net*.

Bouée (s.f.) Pièce de bois retenue par une ancre, et destinée à marquer la place d'une trâle. Les Acadiens prononcent boueï.
Étym.—Normand, *boie*. Du latin, *boja=chaîne*.

Bouette (s.f.) Appât: hareng, palourde, etc., dont on se sert pour la pêche à la morue, au homard.
Étym.—Bas-Breton, *boued*=nourriture, appât, amorce.

Botte (s.m.) "Nom générique désignant toutes sortes d'embarcations, depuis la nacelle jusqu'au steam-boat". Pascal Poirier, Le Parler franco-acadien.
Étym.—Anglais, *boat*.

64201—8½

Brocher (v.a.) Faire un filet de trappe. Brocher une trappe.

Cale (s.f.) Pierres plates fixées entre les travers pour maintenir la trappe au fond de l'eau.

Carrelet (s.m.) Filet de pêche tendu sur un cerceau. Pour y attirer le homard, on "bouette" le centre du carrelet.
Étym.—Carrel, carreau, cf. cadre.

Chafauds (s.m.pl.) Pour échafauds. Même sens que vigneaux.

Échafaud (s.m.) Chafauds.

Échampeau (s.m.) Ligne garnie d'haims et de cale du morutier.

Espar (s.m.) Longue perche de bois maintenue debout par des flotteurs, et placée comme signe de propriété à l'un des bouts de la trâle. Les Acadiens prononcent *spor.*
Étym.—de l'allemand, *poutre, chevron.*

Hallope (s.f.) Longue corde qui relie le carrelet ou la trappe à la bouée. Littré donne à *hallope* le sens de filet de pêche traînant sur le fond.
Étym.—Probablement de l'anglais *hale up.*

Homard (s.m.) Les pêcheurs d'Acadie prononcent, sans aspirer l'h, l'homard. C'est la prononciation en usage sur les côtes de France.

Manigot (s.m.) Sorte de mitaines sans doigts ni pouce que portent les pêcheurs pour se protéger les mains.
Étym.—*Manicle* ou *manique,* du latin *manicula;* même sens.

Palan (s.m.) Pièce longitudinale servant à former le bâti d'une trappe.
Étym.—Palangue, pièce de bois.

Pine (s.f.) Tige de bois pointue sur laquelle on fixe la bouette à l'intérieur d'une trappe. La bouette est retenue sur la *pine* par une petite rondelle de cuir appelée *cuir de pine, peau de pine.*
Étym.—De l'anglais *pin,* cheville.

Quillic (s.m.) Sorte d'ancre en bois lestée de pierres. Aussi appelé *picasse.*
Mot d'origine inconnue.

Salebarde (s.f.) Même sens que carrelet.

Salon (s.m.) Grand bord ou compartiment de la trappe d'où le homard ne peut plus sortir.

Tangon (s.m.) Bouée à laquelle on attache l'un des bouts de la trâle.

Trâle (s.f.) Long cable auquel sont attachées les hallopes.
Étym.—Vieux français, trôlée=bande, troupe, file.

Trappe (s.f.) Voir attrape.

Travers (s.m.) Pièce de bois placée perpendiculairement sur les palans. Le bâti d'une trappe comprend trois travers.

Vigneau (s.m.) Treillis de bois sur lequel on fait sécher la morue.

Virevau (s.m.) Cabestan horizontal servant à tirer les chaloupes à la grève.

BOTANICAL INVESTIGATIONS IN THE GLACIAL LAKES AGASSIZ–SOURIS BASINS

By H. J. Scoggan

The 1951 field season in Manitoba was spent in a survey by panel truck of the various vegetation zones as far north as the ends of highway at Pine Falls, Riverton, Gypsumville, Camperville, and Flin Flon. Preliminary accounts of previous surveys, chiefly in the central and northern parts of the province, have already been published in this series (Scoggan, 1950, 1951, 1952). These, together with the present one, are intended to furnish a picture of the distribution of different plant zones throughout the area. More detailed treatment is reserved for a projected flora of the province, toward which these surveys have been directed.

The first major collecting locality of the 1951 season was Sandilands Forest Reserve, about sixty miles southeast of Winnipeg. This sandy region, in area approximately 190 square miles, occupies a slightly elevated region of terminal moraine and glacial outwash developed as a low island towards the eastern shore of glacial Lake Agassiz. It is included by Halliday (1937) in the Rainy River section of the Great Lakes–St. Lawrence forest region. Limited amounts of black spruce grow in low-lying muskegs, and poplar is present in considerable quantity along the Whiteshell River (Harrison, 1934). According to Halliday, red and white pine apparently occurred in the past in some quantity, but these are now replaced by jack pine, which is particularly well adapted to the light soils of the extensive sandy areas. The following species are characteristic of the sandy pine lands of the reserve: *Equisetum hyemale* var. *affine, Lycopodium complanatum, Osmunda Claytoniana, Pteridium aquilinum* var. *pubescens, Oryzopsis asperifolia, Maianthemum canadense* var. *interius, Clintonia borealis, Smilax lasioneura, Lilium philadelphicum, Corylus americana, Silene antirrhina, Anemone patens* var. *Wolfgangiana, A. quinquefolia* var. *interior, Heuchera Richardsonii, Potentilla tridentata, Prunus pensylvanica, Lathyrus ochroleucus, L. venosus* var. *intonsus, Rhus radicans* var. *Rydbergii, Ceanothus ovatus, Hudsonia tomentosa, Aralia nudicaulis, Arctostaphylos Uva-ursi* var. *coactilis, Gaultheria procumbens, Vaccinium myrtilloides, Apocynum androsaemifolium, Lithospermum canescens, Galium boreale, Viburnum trilobum, Senecio pauperculus,* and *Artemisia camporum.*

Whiteshell Forest Reserve, 1,078 square miles in area, lies on the southwestern margin of the Canadian Shield, about 90 miles east of Winnipeg. The main area is dominated by white spruce and aspen, although jack pine is abundant on the shallow soil overlying the dry granite ridges, and black spruce and tamarack occupy depressions between the ridges. White pine and eastern white cedar are found in moist situations by lakes, at the northwestern limits of their main areas (although the latter has isolated stations at the north end of Lake Winnipegosis). Prickly pear cactus (*Opuntia fragilis*) is abundant in places on rocky lake shores, and is here at or close to its northeastern limit in North America.

The following aquatic plants occur in the reserve: *Elodea canadensis, Calla palustris, Lemna minor, L. trisulca, Spirodela polyrhiza, Ceratophyllum demersum, Nymphaea odorata, Utricularia vulgaris,* and *U. minor.*

Returning to Selkirk, the route entered a region of Red River prairie characterized by such species as *Koeleria cristata, Lilium philadelphicum, Zigadenus elegans, Hypoxis hirsuta, Thalictrum venulosum, Anemone cylindrica, Heuchera Richardsonii, Geum triflorum, Glycyrrhiza lepidota, Elaeagnus commutata, Zizia aurea, Z. aptera, Galium boreale, Campanula rotundifolia, Liatris ligulistylis, Rudbeckia serotina, Erigeron glabellus, Senecio plattensis, Agoseris glauca, Crepis runcinata, Artemisia ludoviciana* var. *gnaphalodes, Grindelia squarrosa,* and *Solidago rigida.*

Continuing northward, the route followed the western shore of Lake Winnipeg in the Manitoba Lowlands section of the northern conifer forest. Extensive areas of swamp and muskeg occur in this low-lying Inter-Lake region. The marshy shore of Lake Winnipeg opposite Hecla Island included 43 species in its vegetation, dominated by *Typha latifolia, Glyceria grandis, Beckmannia syzigachne, Alopecurus aequalis, Calamagrostis canadensis, Carex aquatilis, C. atherodes, C. Bebbii, C. Sartwellii, Scirpus validus* var. *creber, Eleocharis palustris,* and *E. acicularis.*

A short trip was made to Hecla Island, but the next major collecting locality was the region between Lake Manitoba and Lake St. Martin. The horizontal limestone formation at Steep Rock (Plate XVI A) and the disturbed, weathered gypsum floor of the quarry at Gypsumville were notable for the presence of a number of typical prairie species.

Passing southward, a rich white spruce woods near Moosehorn had a fine representation of species characteristic of the northern conifer forest, including *Schizachne purpurascens, Oryzopsis asperifolia, Carex deflexa, Maianthemum canadense* var. *interius, Goodyera repens* var. *ophioides, Orchis rotundifolia, Habenaria obtusata, Cypripedium Calceolus* var. *parviflorum, Mitella nuda, Ribes triste, Rubus pubescens, Rhamnus alnifolia, Viola renifolia, Aralia nudicaulis, Sanicula marilandica, Cornus canadensis, Moneses uniflora, Pyrola virens, P. asarifolia* var. *purpurea, P. secunda* var. *obtusata, Galium triflorum, Linnaea borealis* var. *americana, Viburnum trilobum, Petasites palmatus,* and *Prenanthes alba.*

Continuing southward along the eastern shore of Lake Manitoba, collections were made near Eriksdale, Lundar, Oak Point, and St. Laurent, in the aspen parkland district which forms an ecotone between the northern conifer forest and the prairie grassland region of southwestern Manitoba (see Bird 1930, map p. 361). Representative collections were also made later in the aspen parkland region around St. Lazare (Plate XVI B), near the Saskatchewan border west of Birtle.

Spruce Woods Forest Reserve, southwest of Brandon, has an area of about 225 square miles. Wind action has produced a rolling topography in the sandy soil, which originated from an old delta of Assiniboine River at its entry into glacial Lake Agassiz. Of particular interest is a relict community of scattered individuals and small groups of white spruce, with creeping juniper (*Juniperus horizontalis*) as an associate, in an area of

otherwise almost pure prairie vegetation (Plate XVII A). Bird (1930) has advanced the conjecture that the persistence here of white spruce, following the general readvance northward of the conifer forest upon the retreat of the Pleistocene ice-sheet, is due to peculiar edaphic conditions enabling it to survive in otherwise unfavourable surroundings.

The true prairie flora of southwestern Manitoba, such as remains, is perhaps best preserved in dry, sandy districts in the vicinity of such places as Melita, Lauder, Hartney, Oak Lake, Carberry, and Glenboro. The relationship of the flora to climatic and edaphic factors has been discussed in a previous paper (Scoggan, 1952), with the conclusion that "High summer temperatures, warm dry winds, and relatively low precipitation of varying seasonal distribution and fluctuating widely from year to year, undoubtedly make soil moisture the limiting factor for plant growth in the prairie region." The following species are characteristic of the sandhill and sandy prairie sites: *Equisetum hyemale* var. *intermedium, Selaginella densa, Juniperus horizontalis, Agropyron Smithii, Andropogon Gerardi, A. scoparius, Avena Hookeri, Bouteloua gracilis, B. curtipendula, Calamovilfa longifolia, Elymus canadensis, Festuca saximontana, Koeleria cristata, Muhlenbergia cuspidata, Oryzopsis hymenoides, Panicum Wilcoxianum, Poa compressa, Sporobolus cryptandrus, Stipa comata, S. spartea, S. viridula, Carex filifolia, C. (siccata) foenea, C. obtusata, C. stenophylla* var. *enervis, Cyperus Schweinitzii, Allium stellatum, Lilium philadelphicum, Smilacina stellata, Smilax lasioneura, Zigadenus elegans, Hypoxis hirsuta, Sisyrinchium campestre, Quercus macrocarpa, Comandra pallida, C. Richardsiana, Corispermum marginale, Salsola Kali* var. *tenuifolia, Mirabilis hirsuta, M. nyctaginea, Cerastium arvense, Melandrium Drummondii, Anemone cylindrica, A. multifida, A. patens* var. *Wolfgangiana, Cleome serrulata, Arabis divaricarpa, A. Drummondi, A. hirsuta* var. *pycnocarpa, A. Holboellii* var. *retrofracta, A. Holboellii* var. *Collinsii, Descurainia pinnata* var. *brachycarpa, Draba nemorosa* var. *lejocarpa, Erysimum asperum, E. inconspicuum, Lesquerella ludoviciana, Heuchera Richardsonii, Amelanchier alnifolia, Chamaerhodos Nuttallii, Geum triflorum, Potentilla arguta, P. concinna, P. effusa, P. Hippiana, P. pensylvanica, P. pensylvanica* var. *bipinnatifida, Prunus pensylvanica, P. virginiana, P. Besseyi, Rosa arkansana* var. *suffulta, Spiraea alba, Amorpha canescens, A. nana, Lathyrus venosus* var. *intonsus, Astragalus canadensis, A. caryocarpus, A. tenellus, A. flexuosus, A. goniatus, A. pectinatus, A. striatus, Glycyrrhiza lepidota, Oxytropis Lambertii, Petalostemum candidum, P. occidentale, P. purpureum, P. villosum, Psoralea argophylla, P. esculenta, Linum Lewisii, L. rigidum, L. sulcatum, Polygala Senega, Rhus radicans* var. *Rydbergii, Sphaeralcea coccinea, Viola adunca, V. Nuttallii, V. pedatifida, Mamillaria vivipara, Opuntia polyacantha, Elaeagnus commutata, Oenothera serrulata, Oe. Nuttallii, Arctostaphylos Uva-ursi* var. *coactilis, Androsace occidentalis, Dodecatheon Meadia, Asclepias ovalifolia, A. viridiflora* var. *lanceolata, A. viridiflora* var. *linearis, Collomia linearis, Phlox Hoodii, Hackelia americana, Lappula Redowskii* var. *occidentalis, Lithospermum incisum, L. canescens, Onosmodium occidentale, Verbena bracteata, Agastache Foeni-*

culum, Solanum triflorum, Orthocarpus luteus, Penstemon gracilis, P. albidus, P. nitidus, Orobanche ludoviciana, O. fasciculata, Galium boreale, Houstonia longifolia, Symphoricarpos occidentalis, Campanula rotundifolia, Lobelia spicata var. *hirtella, Achillea Millefolium, Agoseris glauca, Ambrosia psilostachya* var. *coronopifolia, Antennaria aprica, A. nitida, A. campestris, Aster ericoides, A. laevis, A. ptarmicoides, Artemisia frigida, A. camporum, A. caudata* var. *calvens, A. glauca, A. dracunculoides, A. Absinthium, A. ludoviciana* var. *gnaphalodes, A. ludoviciana* var. *latifolia, A. ludoviciana* var. *pabularis, Chrysopsis villosa, Cirsium Flodmani, Echinacea angustifolia, Erigeron elatus, E. glabellus, E. glabellus* var. *pubescens, E. strigosus, E. caespitosus, Gaillardia aristata, Grindelia squarrosa, Gutierrezia diversifolia, G. Sarothrae, Haplopappus spinulosus, Helianthus petiolaris, H. laetiflorus* var. *rigidus, H. laetiflorus* var. *subrhomboideus, Lactuca ludoviciana, L. pulchella, Liatris ligulistylis, L. punctata, Lygodesmia juncea, L. rostrata, Ratibida columnifera, Rudbeckia serotina, Senecio canus, S. densus, S. pauperculus, Solidago missouriensis, S. mollis, S. nemoralis* var. *decemflora, S. rigida,* and *Tragopogon major.*

Saline areas are common in depressions throughout the area, the following species being characteristic: *Distichlis stricta, Puccinellia Nuttalliana, Spartina gracilis, S. pectinata, Juncus bufonius* var. *halophilus, J. Torreyi, Rumex maritimus* var. *fueginus, Atriplex argentea, A. Nuttallii, A. patula, A. patula* var. *hastata, Chenopodium glaucum, Kochia trichophylla, Monolepis Nuttalliana, Salicornia rubra, Salsola Kali* var. *tenuifolia, Suaeda depressa, S. depressa* var. *erecta, Ranunculus Cymbalaria, R. Cymbalaria* f. *hebecaulis, Glaux maritima, Asclepias verticillata, Plantago eriopoda, Aster ericoides, A. Brachyactis,* and *Iva axillaris.*

Because little remains of the original prairie vegetation in Manitoba apart from unbroken lands in the more sandy areas and slopes of hills and valleys, it is interesting to note the presence of many prairie species, in association with numerous common weeds, in such disturbed habitats as roadside clearings, railway embankments, and sandy blowouts in the prairie turf. A characteristic of disturbed habitats, in general, is the "openness" of their plant communities, with little crowding of individuals (Plate XVII B). The abundance of foreign weeds also points to a low degree of competition from the surrounding closed prairie vegetation. The high frequency of numerous prairie species in such habitats indicates the ability of these plants to recolonize newly opened territory, notwithstanding their eradication from most of the area originally occupied by them. A quotation from Shimek (1927) is of direct bearing on this point:

> "The belief that the prairie flora will not return if the prairie is broken is widely prevalent. With it is linked the further belief that the prairie flora is not a climax flora, but that it represents a transition stage which would culminate in a forest with the cessation of prairie fires, were it not for the disturbance of the prairie surface by cultivation.
>
> "It is true that the prairie yields readily to cultivation. The breaking of the prairie turf is sufficient to cause most of the prairie plants to disappear from the broken surface, but there is abundant evidence to

show that it requires continued cultivation to keep them out. Their return is rather slow and is preceded by a transitional mixture of species, but it is quite certain, provided man does not interfere."

Concerning the problem of prairie versus forest, it has been noted in a previous paper (Scoggan, 1952) that ecologists "are of the opinion, in general, that under present climatic conditions woodland and treeless prairie are in a state of balanced tension, one or the other holding the ground in conformity with climatic cycles of varying duration."

REFERENCES

1. Bird, R. D. Biotic communities of the aspen parkland of Central Canada. Ecology, vol. 11, pp. 365-442. 1930.

2. Halliday, W. E. D. A forest classification for Canada. Dept. Mines and Resources, Canada, Forest Service, Bull. 89, pp. 1-50. 1937.

3. Harrison, J. D. B. The forests of Manitoba. Dept. of the Interior, Canada, Forest Service, Bull. 85, pp. 1-80. 1934.

4. Scoggan, H. J. Botanical investigations in Central Manitoba. National Museum of Canada, Bull. 118, pp. 84-92. 1950.

5. ———Botanical investigations along the Hayes River route, Northern Manitoba. National Museum of Canada, Bull. 123, pp. 139-161. 1951.

6. ———Botanical investigations in Manitoba in 1950. National Museum of Canada, Bull. 126, pp. 208-227. 1952.

PLATE XVI

A. Limestone strata at Steep Rock, Portage Bay, Lake Manitoba.

B. Valley of Assiniboine River south of St. Lazare.

PLATE XVII

A. Spruce Woods Forest Reserve near Brandon.

B. Sandy blowout in prairie near St. Lazare.

BOTANICAL INVESTIGATIONS IN THE REINDEER–NUELTIN LAKES AREA, MANITOBA

By W. K. W. Baldwin

During the summer of 1951 the writer made a botanical survey of the northwestern part of Manitoba extending from Reindeer Lake to Nueltin Lake. This field work was designed to fit the larger survey of the whole province being conducted by Dr. H. J. Scoggan (1950, 1951, and 1952) of the National Museum of Canada in preparation for a flora of Manitoba.

ITINERARY

From railhead at Prince Albert, a scheduled flight of the Saskatchewan Government Airways brought the writer to Brochet, Man., which served as base for the summer's work. Here Alex Cook was employed as guide, and on June 25 the first camp was made on Reindeer Lake. Starting on June 28 a canoe trip was taken about 125 miles up the Cochrane River to the sharp bend where the river turns southward after flowing northeastward from the nearby Saskatchewan boundary. Returning by the same route to Reindeer Lake on July 10, a camp was made in Brochet Bay while awaiting chartered aircraft for the flight to Nueltin Lake. Johanneson's Flying Service of Flin Flon, Man., took the party to the southern part of Nueltin Lake which was surveyed by canoe from July 18 to August 1. After the return flight to Brochet a canoe trip was made down the east shore of Reindeer Lake as far as Paskwachi Bay returning to Brochet on August 24 by way of Long Point. Thus the itinerary traversed the northwestern corner of Manitoba up to the boundaries of Saskatchewan and the Northwest Territories.

PREVIOUS WORK

In 1894 J. B. Tyrrell took his party through Reindeer Lake and the Cochrane River en route to Hudson Bay via Kasba Lake and Kazan and Ferguson Rivers. He gave a description of the physical features of this area in his report to the Geological Survey of Canada (1896). The plants collected by this expedition were determined by John Macoun, but there are no collections listed from the Reindeer Lake–Cochrane River region.

A vivid popular account of a canoe trip from Reindeer Lake to Nueltin Lake is given in P. G. Downes' book *Sleeping Island* (1943). An article in *The Beaver,* by Stephen Greenlees (1951) describes his experiences in photography around Sawbill on Reindeer Lake.

In 1947 a collection of plants was made by Dr. Francis Harper near the northwestern extremity of Nueltin Lake in the Northwest Territories only a few miles north of the Manitoba boundary. From this collection A. E. Porsild (1950) prepared an annotated catalogue, in which 134 species and varieties are listed. In 1950 the writer accompanied H. J. Scoggan (1952) to Baralzon and Duck Lakes to the east of the Cochrane River–Reindeer Lake region on a botanical survey of the central northern part of Manitoba. A few miles southwest of our region across the Saskatchewan

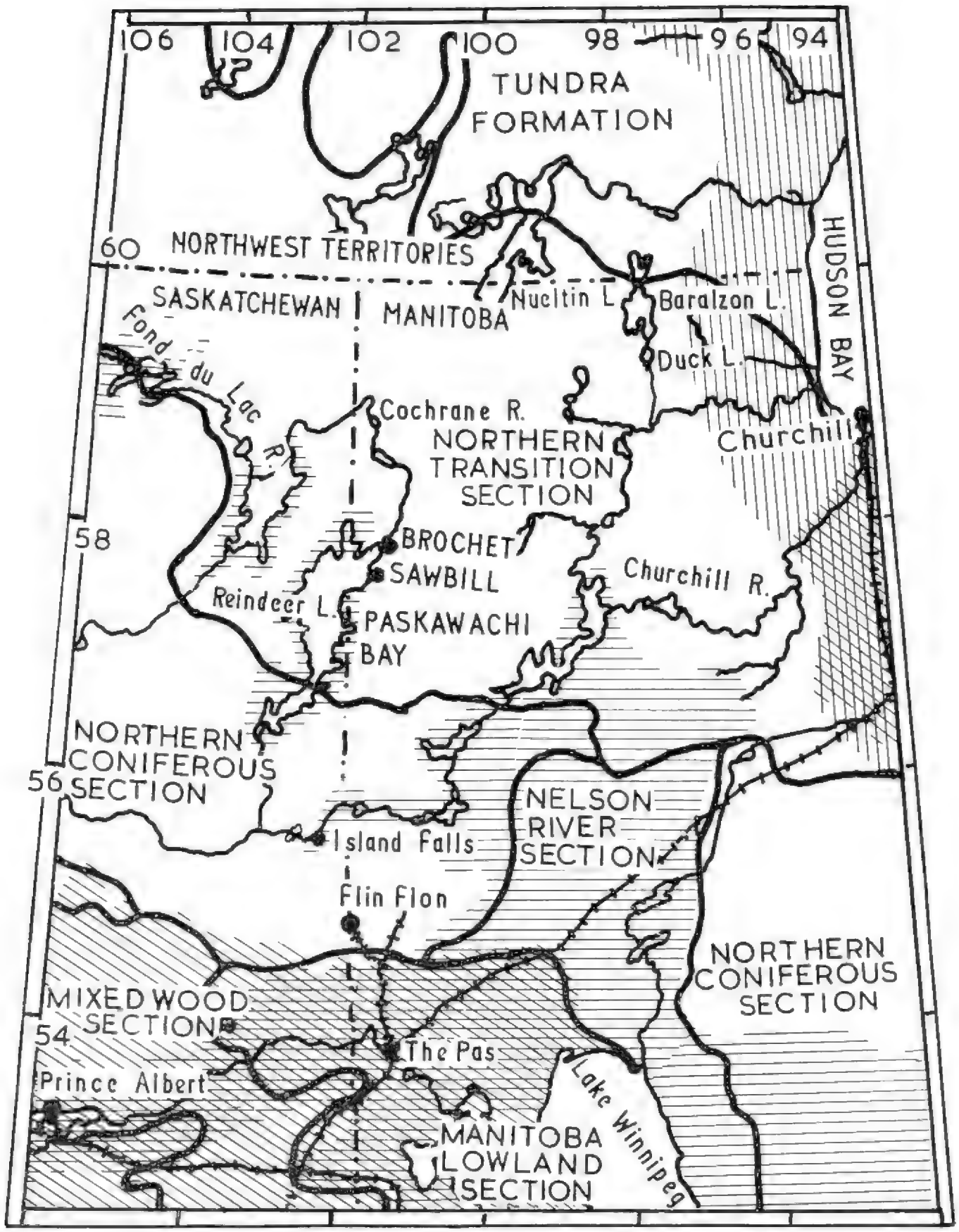


Figure 8. Sketch map of northwestern Manitoba. Areas indicated by shading are: glacial lake basins (horizontal), extent of marine submergence (vertical), Palæozoic and later bedrocks (oblique). The limit of trees and Halliday's Forest Sections are outlined.

boundary, at Windrum Lake north of the Churchill River (Latitude 56° 02′ N., longitude 104° W.), Wendell H. Bryenton made a collection in 1946 of about 140 species and varieties which was determined by A. E. Porsild and deposited in the National Herbarium of Canada. These three collections were made at points outside and roughly surrounding the northwestern corner of Manitoba. There are no records of plant collecting within our area nor of any previous visits by botanists. There are, however, notes on the vegetation of the area made by both Tyrrell and Downes on their travels.

POPULATION AND INDUSTRIES

Chipewyan Indians from the north and Crees from the south overlap in the Reindeer Lake Area. The 1951 Indian population amounted to 352 made up of Barren Lands Band (238) and the Lac la Hache Band (114), according to information supplied by the Indian Affairs Branch. These people make their living by trapping and fishing. A few are employed by the traders and commercial fishermen who ship supplies and fish to railhead by air transport.

The only settlement in the area is at Brochet, at the northeast end of Reindeer Lake. This is centered around the Hudson's Bay Company post and one independent trader. A Roman Catholic mission has been established at the settlement since 1861. The Government of Manitoba maintains an agency for the Game and Fish Division of its Department of Natural Resources, and since the Saskatchewan boundary is nearby, the agent has also served the Government of Saskatchewan and their Airways. The Royal Canadian Corps of Signals operates a signal station located at the settlement.

CLIMATIC DATA

Table I has been compiled from data supplied by the Dominion Meteorological Office, Toronto. Records from Brochet have been taken for only three years 1949 to 1951 inclusive.

TABLE I

Month	Average monthly mean temperature	Average monthly total precipitation
	° F.	inches
January	−23	0·33
February	−16	0·30
March	0	0·22
April	22	0·67
May	38	2·59
June	48	2·13
July	58	2·05
August	53	2·40
September	45	1·71
October	27	1·93
November	11	0·90
December	−14	0·65
Annual average	21	15·89

The records from Brochet show that this district has relatively low temperatures and light precipitation. It has the same annual average of monthly mean temperatures as Port Nelson (the Churchill average is 3 degrees colder), and annual average total precipitation within the same range as other Manitoba stations on the forest-tundra ecotone. For the three years of record, the dates of the last spring frosts at Brochet were June 12, 24 and 5; the dates of the first autumn frosts were September 11, 9, and 18. In 1951 the last shore ice was observed on June 25 at our first camp on Reindeer Lake, 7 miles southwest of Brochet.

GENERAL CHARACTER OF THE DISTRICT

The geology of the Brochet vicinity has been mapped and noted by N. R. Gadd (1948). The whole area lies within the great Canadian Shield of Precambrian rocks which extends across northern Manitoba. In this district the relief is low, and few hills stand more than 200 feet above the general level of the country. The level of Reindeer Lake formerly was 1,150 feet above sea-level but has recently been raised 5 feet. This change took place gradually between the years 1937 and 1942, according to Mr. R. W. Davis at the Island Falls dam of the Churchill River Power Company. The drainage system of the country is youthful with shallow meandering streams cutting into the cover of glacial drift and reaching bedrock only in a few places. There is much swamp and muskeg and many inland lakes with no apparent outlets.

PLATE XVIII

Hilltop view of a stand of black spruce showing also the shore vegetation on the Cochrane River.

Evidence of the work of the last ice age is everywhere apparent. The glacial drift is composed of fine to coarse sand and gravel. Angular boulders cover the ground in many areas and are particularly noticeable on the shores of some of the larger lakes of the Cochrane River system. Prominent glacial features are the sandy eskers which in many places extend for many miles across country (Plate XX). Bush pilots use the trend of the eskers as a convenient and ever present aid to navigation in this district. In the northern part of the area, moraines and drumlinoid drift ridges cover much of the bedrock, which is better exposed southward. Abandoned beaches of the glacial lake, which once occupied higher levels of the Reindeer Lake basin, are well displayed at Long Point about 15 miles southwest of Brochet (Plate XXI). (Glacial Map of North America 1945.)

PLATE XIX

Open mixed forest of black spruce, birch, and jack pine with thin lichen cover on floor, Cochrane River.

The northwestern section of Manitoba differs from the remainder of the province by combining all four of the following features: Precambrian bedrock, thick overburden of glacial drift with extensive moraines and long eskers, location outside the basin of the large glacial lakes to the south and outside the area of marine submergence on the east from Hudson Bay.

The limits of these features are shown on the accompanying sketch map (Figure 8) which is based on the Geological Map of the Dominion of Canada (1945) and the Glacial Map of North America (1945).

MAJOR PLANT COMMUNITIES

(1) Forest Vegetation

Our area lies within the Northern Transition Section of the Central and Northwestern Division of the Boreal Forest Region of Halliday's forest classification for Canada (1937). The southern limit of the Northern Transition Section cuts across the south end of Reindeer Lake. Our route traverses this section at approximately its widest extent from Reindeer Lake to a point close to its northern limit where the Boreal Forest gives way to the Tundra Formation at the north end of Nueltin Lake. The limits of Halliday's sections are shown in the sketch map (Figure 8).

Plate XX

Mixed forest of black spruce and birch on flank of sandy esker beside Cochrane River.

The chief trees of the area are black spruce (*Picea mariana*) and jack pine (*Pinus Banksiana*), the latter being dominant in the drier areas. Birch (*Betula papyrifera* var. *neolaskana*) is common and locally dominant on a few well-watered sites where there is good drainage. Black spruce and tamarack (*Larix laricina*) are characteristic of the bogs and muskegs. The only other trees in the area are white spruce (*Picea glauca*), trembling aspen (*Populus tremuloides*), and balsam poplar (*Populus balsamifera*), which occur but rarely and in widely scattered locations.

The best stand of black spruce seen in our area is shown in Plate XVIII. On this site the drainage and seepage conditions from a rocky hill were the best in this district. Birch and jack pine are commonly mixed with the dominant black spruce to form the open park-like forest which is characteristic of all sites above the level of swamps and muskegs. A thin ground cover of lichens occupies the open spaces of the forest floor. This is illustrated in Plate XIX.

PLATE XXI

Pure jack pine forest regenerating after fire over abandoned beaches at Long Point, Reindeer Lake.

The common associates of the mixed forest of black spruce, birch, and jack pine are *Equisetum sylvaticum* var. *pauciramosum, Lycopodium obscurum*, var. *dendroideum, L. complanatum, Poa glauca, Carex deflexa, C. brunnescens* var. *sphaerostachya, Salix Bebbiana, Geocaulon lividum, Rubus idaeus* var. *strigosus, Prunus pensylvanica, Empetrum nigrum, Cornus canadensis, Pyrola virens, Ledum groenlandicum, Arctostaphylos Uva-ursi, Vaccinium myrtilloides, V. Vitis-Idaea* var *minus*, and *V. uliginosum.*

The appearance of this mixed forest where it covers the flanks and sometimes the crests of lower eskers is seen in Plate XX. The tops of eskers provide migration routes for the caribou which, in times past, have

come down in great numbers from the north to winter in our area and to the south of it. Harper (1949) has given an account of the habits of the caribou which he observed in the vicinity of Windy River on Nueltin Lake just north of the Manitoba-Northwest Territories boundary. Many old caribou trails and a few sets of antlers were seen in 1951. Local trappers reported seeing few caribou in recent seasons.

On the drier sites the jack pine becomes dominant. Plate XXI shows a jack pine forest regenerating after fire over an area of abandoned lake beaches at Long Point at the north end of Reindeer Lake. There were many evidences of fire in the jack pine and mixed forest. Three separate forest fires were observed burning at one time on July 3 in the vicinity of Chipewyan Falls on Cochrane River.

PLATE XXII

Muskeg and marsh surrounding landlocked lake near Long Point, Reindeer Lake. Habitat of *Scheuchzeria palustris* var. *americana*.

On the borders of wet spruce woods and beside waterfalls and rapids, the flora was notably richer in species, but such moist mossy habitats were few and widely scattered in our area. In general, the dry higher levels change abruptly to muskeg, marsh, and lake with little or no mesophytic habitat intervening. Plate XXV illustrates the vegetation around a rapids

and will serve as an example of these better sites. The following list is representative of the species collected from such places in addition to those already listed above for the mixed forest:

Equisetum scirpoides, Lycopodium annotinum var. *pungens, Poa pratensis, P. alpina, P. palustris, Carex disperma, C. media, Goodyera repens, Corallorhiza trifida, Polygonum amphibium* var. *stipulaceum, Stellaria longifolia, S. calycantha, Ribes glandulosum, R. triste, R. hudsonianum, Rubus paracaulis, R. acaulis, Viola palustris, Epilobium angustifolium, E. palustre, E. glandulosum* var. *adenocaulon, Pyrola secunda, P. secunda* var. *obtusata, P. minor, Galium trifidum, Viburnum edule, Petasites palmatus,* and *Antennaria rosea.*

The following five species occurred in similar moist habitats but only rarely and at the southern part of our region on Reindeer Lake: *Maianthemum canadense* var. *interius, Aralia nudicaulis, Trientalis borealis, Scutellaria epilobiifolia,* and *Lycopus uniflorus.*

PLATE XXIII

Muskeg around small inland lake near Cochrane River.

(2) MUSKEGS

Muskegs are common in our area around small inland lakes (Plate XXIII), and in extensive zones between marsh and black spruce forest in the dreary level stretches of country (Plate XXII). Scattered and

stunted black spruce and larch are typical of these sphagnum bogs which are such a characteristic feature of the boreal forest of Canada. The muskeg species of our area are listed below.

Picea mariana, Larix laricina, Eriophorum medium, E. spissum, Carex chordorrhiza, C. disperma, C. tenuiflora, C. canescens, C. brunnescens, C. media, C. limosa, C. paupercula var. *irrigua, C. pauciflora, Smilacina trifolia, Spiranthes Romanzoffiana, Salix pedicellaris* var. *hypoglauca, Betula glandulosa, Ranunculus lapponicus, Drosera rotundifolia, Potentilla palustris, Rubus Chamaemorus, R. acaulis, Ledum groenlandicum, Kalmia polifolia, Andromeda Polifolia, Chamaedaphne calyculata, Oxycoccus microcarpus, Menyanthes trifoliata* var. *minor, Pinguicula villosa,* and *Galium trifidum.*

PLATE XXIV

Flooded shoreline of Reindeer Lake at Sawbill showing *Cicuta mackenzieana* in flower.

(3) MARSHES

Our area contains much marshland in sheltered bays of the bigger lakes (Plate XXIV) in some inland lakes (Plate XXII) and particularly in the slow moving stretches of the Cochrane River (Plate XXVII). The most frequently occurring species are listed below:

Equisetum fluviatile forma *Linnaeanum, Sparganium angustifolium, Eriophorum medium, E. angustifolium, Carex aquatilis, C. limosa, C. rostrata, Calla palustris, Potentilla palustris, Hippuris vulgaris,* and *Menyanthes trifoliata* var. *minor.*

Occurring occasionally in marshy habitats, but often in local abundance at the south end of our region, were the following species:

Typha latifolia, Scheuchzeria palustris var. *americana, Sagittaria cuneata, Eriophorum gracile, Scirpus rubrotinctus, Carex diandra, Cicuta bulbifera, C. mackenziana,* and *Lysimachia thyrsiflora.*

(4) Aquatic Vegetation

Aquatics, submersed and with floating leaves, included the following species: *Isoetes muricata, Sparganium angustifolium, S. hyperboreum, Potamogeton Friesii, P. alpinus* ssp. *tenuifolius, P. gramineus, P. Richardsonii, Sagittaria cuneata, Elodea canadensis, Eleocharis acicularis* var. *submersa, Polygonum amphibium* var. *stipulaceum* forma *fluitans, Nuphar*

Plate XXV

Richer and more varied vegetation beside rapids of the Sawbill River which flows into Reindeer Lake.

variegatum, Ranunculus trichophyllus, R. trichophyllus var. *eradicatus, Caltha natans, Subularia aquatica, Myriophyllum alternifolium, Hippuris vulgaris* forma *fluviatilis, Utricularia vulgaris,* and *U. intermedia.*

(5) Vegetation of River and Lake Shores

On sandy shores of lakes and rivers colonies of the following species occurred:

Equisetum arvense var. *boreale, Poa alpigena, Agrostis scabra, Carex brunnescens, C. lenticularis, C. saxatilis, Juncus filiformis, Luzula parviflora, Potentilla norvegica, Barbarea orthoceras,* and *Epilobium angustifolium.*

On wet shores of silt and sand, particularly on Reindeer Lake, where abandoned beaches have again been flooded by the modern power dam, the following species were collected, in addition to the preceding list: *Glyceria borealis, G. striata, G. grandis, Poa pratensis, Alopecurus aequalis, Eleocharis palustris, Scirpus atrocinctus, Carex aenea, Juncus Vaseyi, J. brevicaudatus, Sagina nodosa, Ranunculus reptans, Rorippa islandica* var. *Fernaldiana, Cardamine pensylvanica, Parnassia Kotzebuei, Callitriche anceps, Viola palustris, V. pallens,* and *Sium suave.*

Willow thickets were chiefly and often exclusively formed of one species (*Salix planifolia*). The willow thickets on Reindeer Lake have been drowned by the damming of the lake waters, although the top branches are frequently still alive (Plate XXVI). New thickets related to the present water levels have not yet become established. The original

PLATE XXVI

Shoreline of black spruce forest drowned by dammed waters of Reindeer Lake at Sawbill.

appearance of the Reindeer Lake shore can be pictured from the rivershore thickets which are such a striking feature of the Cochrane River (Plate XVIII), particularly in those slow moving stretches where much alluvium has been deposited (Plate XXVII). Associated with *Salix planifolia* on the landward side of willow thickets was *S. Bebbiana.*

Alder thickets occurred on more sheltered shores and around small inland lakes. In our region the ranges of *Alnus crispa* and *A. rugosa* var. *americana* overlap, and they appear to be present in about equal numbers.

Other lakeshore thickets were formed by dwarf birches *Betula glandulosa* and *B. occidentalis*. Sweet gale (*Myrica Gale*) forms low thickets and was locally abundant in a few places, notably on the shores of deep and clear inland lakes.

On boggy shores low thickets were formed by the common ericaceous plants: *Ledum groenlandicum, Kalmia polifolia, Andromeda Polifolia, Chamaedaphne calyculata,* and *Vaccinium uliginosum.*

Shorelines of rivers and lakes were often marked by a narrow zone of tall grasses usually having the bleached stalks of the previous season still standing. These grasses are *Calamagrostis canadensis* and its variety *robusta.*

PLATE XXVII

Zonation on shore of Cochrane River showing marsh, willow thicket, and forest composed chiefly of black spruce.

(6) ROCK CLIFF VEGETATION

Only three localities were encountered where rock faces were sufficiently clear of glacial drift to provide a habitat for plants which grow on such substrates. One of these hills of gneissic rocks, which stands out as a landmark on the Cochrane River, is shown in Plate XXVIII. From these rocky habitats the following species were collected: *Woodsia ilvensis, Dryopteris Robertiana, D. fragrans* var. *remotiuscula, Cryptogramma crispa* var. *acrostichoides, Polypodium virginianum, Festuca brachyphylla, Poa glauca, Agrostis scabra, Carex arctogena, C. brunnescens, Corydalis sempervirens, Saxifraga tricuspidata, Potentilla tridentata,* and *Ledum decumbens.*

(7) The Forest-Tundra Ecotone

At the northern limit of our area, the boundary between Manitoba and Northwest Territories, the black spruce and jack pine forest still occurs on shores and lowlands. At the southern end of Nueltin Lake the tops of the hills, some lower gravelly knolls, and the most exposed islands are frequently barren (Plate XXIX). The northern element in our flora is preponderant in the following list of plants collected from these barren habitats: *Lycopodium Selago, Poa glauca, Calamagrostis purpurascens, C. lapponica* var. *neartica, C. canadensis* var. *scabra, Agrostis scabra, A.*

Plate XXVIII

Granite hill on Cochrane River providing a rocky substrate and cliff faces which are uncommon in our area.

borealis, Carex arctogena, C. supina ssp. *spaniocarpa, C. glacialis, C. Bigelowii, C. Williamsii, Luzula confusa, Betula occidentalis, B. glandulosa, Geocaulon lividum, Stellaria longipes* var. *Edwardsii, Saxifraga tricuspidata, Empetrum nigrum, Ledum decumbens, Loiseleuria procumbens, Arctostaphylos alpina, A. rubra, Vaccinium uliginosum* var. *alpinum, V. Vitis-Idaea* var. *minus,* and *Artemisia canadensis.*

The forest of the southern Nueltin Lake vicinity was similar in composition to that already described. Jack pine is here found north of the range shown in *Native Trees of Canada* (1949), and the same relation to the main range is shown by balsam poplar which was collected here but not on Reindeer Lake nor on Cochrane River. Balsam poplar was also collected by Harper on Nueltin Lake (Porsild, l.c.). Trembling aspen occurred occasionally on Nueltin Lake, as on Reindeer Lake. The following six species were collected in the woods of Nueltin Lake but were not

seen southward in our area. *Dryopteris disjuncta, Carex loliaceae, Pyrola grandiflora* var. *canadensis, Veronica scutellata, Linnaea borealis* var. *americana,* and *Arnica lonchophylla* ssp. *genuina.*

PLATE XXIX

Treeless morainic hills at south end of Nueltin Lake with black spruce forest on lowlands and lakeshore.

In wet open areas the following northern species were collected at Nueltin Lake and not elsewhere in our area: *Scirpus cespitosus* var. *callosus, Eriophorum Scheuchzeri, Carex capillaris,* and *Tofieldia pusilla.*

Along the shores of Nueltin Lake another eight species were collected, which also did not appear southward in our area: *Deschampsia caespitosa* var *glauca, Carex Buxbaumii, C. Bigelowii* forma *anguillata, C stans, Luzula multiflora, L. spicata, Salix herbacea,* and *S. glauca* var. *acutifolia.*

(8) VEGETATION OF CLEARINGS AND SETTLEMENTS

Settlement and interaction of the white man's civilization on this wilderness area have evidently introduced very few weeds. These factors have produced, however, a disturbed habitat, characterized by the following species collected at Brochet, and at a few outlying fishing and trapping camps where there was enough continuous settlement to modify the original vegetation considerably. Lamb's quarters (*Chenopodium album*), Shepherd's-purse (*Capsella bursapastoris*), and Common Yarrow (*Achillea Millefolium*) are introduced weeds naturalized from Europe. Pineapple-weed (*Matricaria matricarioides*) is another weed, having become naturalized from the Pacific States. *Lepidium densiflorum* is probably adventive to North America. The wide ranging Squirrel-tail Grass (*Hordeum jubatum*)

is often a troublesome weed in cultivated lands. *Puccinellia Nuttalliana* is indigenous to Mackenzie, Yukon, and southwards but locally adventive eastwards.

The following species are native plants from openings and thickets in the surrounding forest which have successfully invaded clearings around settlements: *Festuca brachyphylla, Poa pratensis, P. glauca, Agropyron trachycaulum* var. *novae-angliae, A. trachycaulum* var. *glaucum, Calamagrostis canadensis, C. inexpansa* var. *brevoir, Carex foenea, C. deflxa, Rumex fenestratus, Stellaria longifolia, S. calycantha, Corydalis sempervirens, Draba nemorosa* var. *lejocarpa, Potentilla norvegica, Rubus idaeus* var. *strigosus, Geum macrophyllum* var. *perincisum, Prunus pensylvanica, Epilobium angustifolium, Erigeron angulosus* var. *kamtschaticus,* and *Hieracium umbellatum.*

(9) Garden Plants

A small garden has been kept for many years by the Rev. Father Egenolf at the Roman Catholic Mission at Brochet, and Mrs. W. R. Garbutt has successfully grown vegetables and flowers at the Hudson's Bay Company manager's house. Both gardens face south on the sandy terrace on which the settlement is built, and both have been mulched to fertilize the soil and retain moisture in the dry summer months. Peas, beans, lettuce, radishes, excellent carrots, onions, and beets have been grown. A half bag of potatoes planted in 1950 yielded a harvest of three bags. Rhubarb has been precariously established for a few years. Cabbage has been grown with fair success using a cold frame which also helped produce early radishes and lettuce. Larkspur was a feature of the 1951 flower garden which also had zinnias, nasturtiums, and asters. Pansies have occasionally reseeded themselves, peonies have flowered successfully, but iris failed after two years.

CATALOGUE

The following catalogue lists 237 species and major varieties of vascular plants. The reduction in number of species from 237 in our area to 134 collected on Nueltin Lake by Harper (Porsild, 1.c.) seems to indicate that a considerable number of plants reach their northern limits between Reindeer and Nueltin Lakes. In addition to a number of records of species rarely collected or doubtfully determined there are ten for which there are apparently no previous Manitoba records.

Calamagrostis purpurascens
C. lapponica var. *neartica*
Carex arctogena
C. loliaceae
C. supina ssp. *spaniocarpa*
C. Bigelowii forma *anguillata*
Luzula spicata
Callitriche anceps
Myriophyllum alternifolium
Pyrola grandiflora var. *canadensis*

64201—9½

Collections from the northeast end of Reindeer Lake were made at a number of localities between Long Point at latitude 57° 52′ N., longitude 101° 51′ W., and Paskwachi Bay at latitude 57° 14′ N., longitude 101° 55′ W. Localities on the Cochrane River extended from latitude 57° 58′ N., longitude 101° 28′ W., to latitude 58° 58′ N., longitude 101° 49′ W. At the south end of Nueltin Lake, collections were made from latitude 59° 48′ N., longitude 99° 39′ W., to latitude 59° 43′ N., longitude 100° 08′ W.

Abbreviations: RL.—Reindeer Lake
CR.—Cochrane River
NL.—Nueltin Lake

Approximately 3,200 sheets of plant specimens were obtained, representing 448 collections from numerous localities. A complete set is in the National Herbarium of Canada.

The catalogue is arranged in the order of Gray's Manual, eighth edition (1950).

Equisetum arvense L. var. **boreale** (Bong.) Ledeb.
CR., sandy beach, No. 2057; NL., lakeshore, No. 2179; NL., lakeshore below gravel ridge, No. 2278; RL., sandy bank on lakeshore, No. 2420.

E. sylvaticum L. var. **pauciramosum** Milde
CR., black spruce woods above river shore, No. 2040; CR., white spruce stand on flank of sandy esker, No. 2115; NL., open black spruce woods, No. 2178; NL., wet black spruce woods beside falls, Nos. 2266 and 2270; RL., sandy bank on lakeshore, No. 2421.

E. fluviatile L. forma **Linnaeanum** (Döll) Broun
RL., muskeg around small lake, No. 2034; CR., marshy outlet from lake, No. 2068; NL., marsh, No. 2287; RL., open black spruce bog, No. 2341. Common and abundant on alluvium of Cochrane River and silted bays of the larger lakes.

E. scirpoides Michx.
RL., wet black spruce woods, No. 2343.

Lycopodium Selago L.
NL., bare knoll, No. 2193.

L. annotinum L.
RL., black spruce woods beside rapids, No. 2350.

L. annotinum L. var. **pungens** (LaPylaie) Desv.
RL., open black spruce forest above shoreline, No. 2021; NL., open black spruce woods, No. 2197.

L. clavatum L. var. **monostachyon** Grev. & Hook.
CR., in willow thicket, No. 2064; NL., open black spruce woods, No. 2197A.

L. obscurum L.
RL., open black spruce forest above shore, No. 2020A.

L. obscurum L. var. **dendroideum** (Michx.) D.C. Eat.

RL., open black spruce forest above shore, No. 2020; RL., burned black spruce forest, No. 2383.

L. complanatum L.

RL., open black spruce forest above shore, No. 2019; NL., open black spruce woods, No. 2195; NL., flank of sandy esker, No. 2246; RL., burned black spruce forest, No. 2380.

Isoetes muricata Dur.

CR., river through silted marsh, No. 2098; RL., inland lake, silted sandy bottom, 3 feet deep, No. 2444.

Woodsia ilvensis (L.) R. Br.

CR., crevices on cliff face of granite hill, No. 2076; RL., crevices of steep rocky hillside of gneiss, No. 2385.

Dryopteris disjuncta (Ledeb.) C. V. Mort.

NL., wet black spruce woods, No. 2284.

D. Robertiana (Hoffm.) Christens.

RL., valley in steep rocky hillside of gneiss, No. 2387.

D. fragans (L.) Schott. var. **remotiuscula** Komarov

RL., wall of rocky valley in steep hillside of gneiss, No. 2388.

Cryptogramma crispa (L.) R. Br. var. **acrostichoides** (R. Br.) C. B. Clarke.

RL., in crevices on ridges of basic intrusive rocks, No. 2148.

Polypodium virginianum L.

CR., rock crevices in granite hill, No. 2075; RL., on ledges of basic intrusive rocks, No. 2145; RL., on ledges of steep rocky hillside of gneiss, No. 2384.

Picea glauca (Moench) Voss

CR., foot of steep flank of sandy esker, No. 2114; NL., foot of gravel ridge, No. 2255.

P. mariana (Mill.) BSP.

CR., open forest, dominant tree, No. 2039; NL., dominant forest tree, here about 40 feet high in patches, No. 2206.

Larix laricina (DuRoi) K. Koch

RL., open black spruce forest, No. 2015; NL., wet black spruce woods, No. 2205.

Pinus Banksiana Lamb.

RL., open black spruce woods, rocky outcrop, No. 2031; NL., dry sandy hillside, No. 2299.

Juniperus communis L. var. **depressa** Pursh

RL., open black spruce forest, stony ground, No. 2022; NL., flank of gravel ridge, No. 2276.

Typha latifolia L.

RL., Paskwachi River, outlet marsh, No. 2408.

Sparganium angustifolium Michx.
RL., marshy creek outlet, No. 2362; RL., creek outlet, No. 2392.

Sparganium hyperboreum Laestad.
CR., marshy outlet from lake, No. 2067.

Sparganium sp.
RL., inland lake, silted sandy bottom, 3 feet deep, No. 2441.

Potamogeton Friesii Rupr.
RL., bay flooded by dammed lake, No. 2351.

P. alpinus Balbis ssp. **tenuifolius** (Raf.) Ogden
RL., flooded bay at creek outlet, No. 2331; RL., bay flooded by dammed lake, No. 2352.

P. gramineus L.
CR., at cutting through sandy esker, No. 2111; NL., creek through marsh, No. 2286; RL., bay at creek outlet, No. 2344. This and the following species were the commonest pondweeds.

P. Richardsonii (Ar. Benn.) Rydb.
CR., river through silted marsh, No. 2101; RL., narrows between bay and lake, No. 2325; RL., bay flooded by dammed lake, No. 2364.

Scheuchzeria palustris L. var. **americana** Fern.
RL., marsh around landlocked lake, No. 2418.

Sagittaria cuneata Sheldon
RL., marshy creek outlet, No. 2360; RL., inland lake, silted sandy bottom, 3 feet deep, No. 2445.

Elodea canadensis Michx.
RL., inland lake, silted sandy bottom, 3 feet deep, No. 2443.

Bromus inermis Leyss
RL., sandy bank at lakeshore of settlement, No. 2437.

Festuca brachyphylla Schultes
CR., grassy point, old camp-site, No. 2063; RL., on ridges of basic intrusive rocks, No. 2149; RL., sandy terrace around settlement, Nos. 2171 and 2173; NL., flank of sandy esker, No. 2248.

Puccinellia Nuttalliana (Schultes) Hitchc.
RL., sandy terrace around settlement, No. 2435.

Glyceria borealis S. Wats.
RL., marshy shore, No. 2361.

G. striata (Lam.) Hitchc.
RL., flooded and silted lakeshore, No. 2324.

G. grandis S. Wats.
RL., lakeshore at old camp-site, No. 2318.

Poa annua L.
CR., portage through black spruce forest, No. 2130.

P. alpigena (Fries) Lindm. f.
CR., sandy beach, No. 2060; CR., portage through black spruce forest, No. 2135; RL., shore of rocky narrows, No. 2139; NL., gravel spit, No. 2215.

P. pratensis L.
CR., grassy meadow on lake shore, old camp-site, No. 2089; NL., wet black spruce woods, beside falls, No. 2268; RL., raised sandy beach flooded by dammed lake, No. 2411.

Poa palustris L.
CR., portage through black spruce forest, No. 2137.

P. alpina L.
CR., portage through black spruce forest, No. 2134.

P. glauca M. Vahl
CR., grassy point, old camp-site, No. 2066; RL., sandy terrace around settlement, Nos. 2163, 2174, and 2433; NL., barren gravel ridge, No. 2234; NL., flank of sandy esker, No. 2247; RL., bare area of granitic rocks, No. 2366. Frequent everywhere in our area.

Agropyron trachycaulum (Link) Malte var. **novae-angliae** (Scribn.) Fern.
RL., sandy clearing around old cabins, No. 2319; RL., sandy bank at lakeshore of settlement, No. 2432.

A. trachycaulum (Link) Malte var. **glaucum** (Pease & Moore) Malte
RL., sandy bank of lakeshore of settlement, No. 2436.

Hordeum jubatum L.
RL., sandy terrace around settlement, No. 2172.

Trisetum spicatum (L.) Richter var. **molle** (Michx.) Beal
CR., sandy portage through open jack pine forest, No. 2084.

Deschampsia caespitosa (L.) Beauv. var. **glauca** (Hartm.) Lindm. f.
NL., gravel spit, No. 2214.

Calamagrostis purpurascens R. Br.
NL., flank of gravel ridge, No. 2280.

Calamagrostis lapponica (Wahlenb.) Hartm. var. **neartica** Porsild
NL., barren gravel ridge, No. 2235A; NL., barren exposed island, No. 2308; RL., dry sandy trail through jack pine woods, No. 2428.

C. canadensis (Michx.) Nutt.
RL., flooded lakeshore No. 2353; RL., sandy meadow around fishing camp, No. 2423.

C. canadensis (Michx.) Nutt. var. **robusta** Vasey
RL., silted shore, No. 2143.

C. canadensis (Michx.) Nutt. var. **scabra** (Presl) Hitchc.
NL., barren gravel ridge, No. 2235.

C. inexpansa Gray var. **brevior** (Vasey) Stebbins
RL., sandy meadow around fishing camp, No. 2422.

Calamagrostis sp.
NL., tips of leaves floating like *Sparganium* on shallow water, No. 2288. This matches a specimen collected by Dr. Harper (No. 2373) 20 miles northward also on Nueltin Lake.

Agrostis scabra Willd.
CR., silted river shore, No. 2123; RL., ledges of basic intrusive rocks, No. 2152; NL., gravel spit, No. 2213A; NL., barren gravel ridge, No. 2236A; RL., on log stranded at creek outlet, No. 2333; RL., bare area of granitic rocks, No. 2365. This grass shares with *Calamagrostis* spp. the distinction of being the commonest grass particularly on shores of rivers and lakes.

A. borealis Hartm.
NL., gravel spit, No. 2213; NL., barren gravel ridge, No. 2236.

Alopecurus aequalis Sobol.
RL., lakeshore at old camp-site, No. 2317; RL., raised sandy beaches flooded by dammed lake, No. 2424.

Eleocharis acicularis (L.) R. & S.
CR., in moss on wet sand, No. 2119; CR., silted river shore, No. 2128.

E. acicularis (L.) R. & S. var. **submersa** (Hj. Nills.) Svenson
CR., river through silted marsh, No. 2099; RL., inland lake, silted sandy bottom, 3 feet deep, No. 2440.

E. palustris (L.) R. & S.
RL., silted shore, No. 2142; RL., raised sandy beaches flooded by dammed lake, No. 2415.

Scirpus cespitosus L. var. **callosus** Bigel.
NL., wet sedge meadow below bare knoll, No. 2202.

S. rubrotinctus Fern.
RL., Paskwachi River shore, No. 2410.

S. atrocinctus Fern.
RL., raised sandy beaches flooded by dammed lake, No. 2412.

Eriophorum Scheuchzeri Hoppe
NL., open bog, No. 2230.

E. medium Anders.
RL., in sphagnum at creek outlet, No. 2165; RL., bog flooded by dammed lake, No. 2327.

Eriophorum opacum (Bjornstr.) Fern.
CR., willow thicket beside falls, No. 2079; CR., on small patch of wet clay, No. 2127.

E. spissum Fern.
CR., muskeg around small lake, No. 2053; CR., moist cleft on flank of granite hill, No. 2078; RL., forming tussocks in marsh No. 2167; NL., open bog, No. 2228.

E. gracile W. D. J. Koch
RL., marsh around landlocked lake, No. 2419.

E. angustifolium Honckeny
CR., on small patch of wet clay, No. 2126.

E. angustifolium Honckeny var. **majus** Schultz
RL., marshy outlet of creek, No. 2170.

Carex arctogena H. Smith
CR., exposed cliff face of granite hill, No. 2077; NL., drying mud on barren exposed island, No. 2303.

C. chordorrhiza L. f.
RL., muskeg around small lake, in sphagnum, No. 2036.

C. foenea Willd.
CR., grassy point, old camp-site, No. 2062.

C. diandra Schrank
RL., edge of marsh, No. 2358.

Carex disperma Dew.
NL., wet black spruce woods beside falls, No. 2267; RL., open black spruce bog, Nos. 2337 and 2342.

C. tenuiflora Wahlenb.
RL., open black spruce bog, No. 2335; RL., in alder thicket, No. 2381.

C. loliacea L.
NL., wet black spruce woods beside falls, No. 2265.

C. canescens L.
RL., silted shore, No. 2141; NL., open bog, No. 2295; RL., edge of flooded bog, No. 2328.

C. brunnescens (Pers.) Poir.
CR., dry rock cleft in granite hill, No. 2073; CR., sandy portage through open jack pine forest, No. 2088; NL., open bog, No. 2240; RL., on ledges of steep rocky hillside of gneiss, No. 2386.

C. brunnescens (Pers.) Poir. var. **sphaerostachya** (Tuckerm.) Kukenth.
NL., open black spruce woods, No. 2198; NL., portage through bog No. 2293.

C. aenea Fern.
RL., raised sandy beaches flooded by dammed lake, No. 2417.

C. praticola Rydb.
RL., path through jack pine woods, No. 2177.

C. supina Wahlenb. ssp. **spaniocarpa** (Steud.) Hult.
NL., flank of gravel ridge, No. 2238.

Carex deflexa Hornem.
RL., on sand, flooded shore of black spruce forest, No. 2016; CR., under dwarf birch bushes, No. 2065; NL., open black spruce woods, No. 2232; NL., portage through open black spruce woods, No. 2298. The most frequent woodland sedge in our area.

C. glacialis Mack.
NL., barren exposed island, No. 2305.

C. sp. nearest **C. rufina** Drej.
NL., gravel spit, No. 2219.

64201—10

This specimen differs from typical *C. rufina* whose American range is restricted to Greenland. It matches a single Canadian collection in the National Herbarium from Northwest Territories, Keewatin District: lake on the Tha-anne River, 60° 58′ N., about 97° W. Rolling plains, 800 feet above sea-level, near the edge of the timber: edge of summer dry pond, July 12-13, 1930, A. E. Porsild, No. 5566.

C. aquatilis Wahlenb.

CR., creek through marsh, No. 2048; RL., lakeshore at old camp-site, No. 2313; RL., marsh flooded by dammed lake, No. 2390. The most abundant sedge of the marshlands of our area.

C. stans Drej.

NL., sandy lakeshore, No. 2239.

C. Bigelowii Torr.

NL., barren exposed island, No. 2302.

C. Bigelowii Torr. forma **anguillata** (Drej.) Fern.

NL., silted lakeshore, No. 2191.

C. lenticularis Michx.

CR., sandy shore of small lake, No. 2056.

Carex media R. Br.

CR., old camp-site at river bend, No. 2105; NL., wet black spruce woods, No. 2272; RL., open black spruce bog, No. 2338.

C. Buxbaumii Wahlenb.

NL., rocky islet in marsh, No. 2224.

C. limosa L.

RL., muskeg around small lake, in sphagnum, No. 2038; RL., marshy outlet of creek, No. 2169.

C. paupercula Michx. var. **irrigua** (Wahlenb.) Fern.

CR., muskeg around small lake, No. 2050; RL., in sphagnum at creek outlet, No. 2166; NL., wet sedge meadow, No. 2201; NL., in muskeg below gravel ridge, No. 2237; RL., marshy shore, No. 2401.

C. capillaris L.

NL., wet sedge meadow below bare knoll, No. 2200.

C. Williamsii Britt.

NL., drying mud on barren exposed island, No. 2304.

C. pauciflora Lightf.

RL., open sphagnum bog around small lake, No. 2374.

C. rostrata Stokes

RL., marshy outlet of creek, No. 2168; NL., marsh, No. 2227; RL., marsh flooded by dammed lake, No. 2391.

C. saxatilis L.

CR., sandy shore of small lake, No. 2054; CR., boulder shore of island, No. 2113; NL., gravel spit, No. 2218; NL., rock crevices at falls, No. 2274; NL., sandy shore of inland pool, No. 2289.

Calla palustris L.
RL., marshy outlet of creek, No. 2164. Locally common in marshes in Reindeer Lake vicinity.

Juncus Vaseyi Engelm.
RL., raised sandy beaches flooded by dammed lake, No. 2413.

J. filiformis L.
CR., sandy beach, No. 2070; CR., lakeshore, No. 2087; NL., gravel spit, No. 2221.

J. brevicaudatus (Engelm.) Fern.
CR., wet sand, No. 2116; RL., raised sandy beaches flooded by dammed lake, No. 2414.

Luzula parviflora (Ehrh.) Desv.
CR., wet ground at end of portage (through jack pine forest) No. 2086; NL., lakeshore, No. 2204.

L. spicata (L.) DC.
NL., gravel spit, No. 2211; NL., sandy opening in black spruce woods, No. 2292.

L. confusa Lindeberg
NL., barren exposed island, No. 2309.

L. multiflora (Retz.) Lejeune
NL., lakeshore, No. 2196; NL., gravel spit, No. 2212.

Tofieldia pusilla (Michx.) Fern.
NL., sedge meadow below bare knoll, No. 2199.

Smilacina trifolia (L.) Desf.
CR., in sphagnum around muskeg, No. 2051; NL., open bog, No. 2229. Common in sphagnum bogs throughout our area.

Maianthemum canadense Desf. var. **interius** Fern.
RL., gravel ridge between lake and bog, No. 2407.

Spiranthes Romanzoffiana Cham.
RL., open black spruce bog, No. 2334.

Goodyera repens (L.) R. Br. var. **ophioides** Fern.
RL., gravel ridge between lake and bog, No. 2403.

Corallorhiza trifida Chatelain
RL., damp black spruce woods, No. 2340; RL., black spruce forest on rocky substrate, No. 2396.

Salix herbacea L.
NL., silted lakeshore, No. 2188.

S. arctophila Cockerell
CR., old camp-site at river bend, No. 2104.

S. ?MacCalliana Rowlee
RL., edge of clearing, 8 feet high, No. 2323.

S. glauca L. var. **acutifolia** (Hook.) Schneider
NL., thicket, 5 feet high, on shore, No. 2192; NL., below sandy esker near lakeshore, Nos. 2249, 2250, and 2251.

Salix pyrifolia Anderss.

RL., open black spruce forest, 8 feet high, No. 2014; CR., river shore, No. 2043; RL., thicket on silted shore, No. 2154.

S. myrtillifolia Anderss.

CR., old camp-site at river bend, No. 2103.

S. Bebbiana Sarg.

RL., open black spruce forest, 8 feet high, No. 2013; CR., dry ground above shoreline, No. 2041; RL., black spruce forest at rocky narrows, No. 2156.

S. pedicellaris Pursh var. **hypoglauca** Fern.

RL., muskeg around small lake, No. 2037.

S. planifolia Pursh

CR., river shore, No. 2042; RL., thicket on silted shore, No. 2155; NL., lakeshore thickets, 7 feet high, No. 2207. The commonest willow throughout our area forming extensive shore thickets.

Populus tremuloides Michx.

RL., small grove below ridge of basic intrusive rocks, No. 2144; NL., small grove at foot of gravel ridge, No. 2277.

P. balsamifera L.

NL., small grove at foot of gravel ridge, No. 2279.

Myrica Gale L.

CR., shoreline, No. 2045; NL., lakeshore, No. 2185; NL., silted lakeshore, No. 2296.

Betula papyrifera Marsh. var. **neolaskana** (Sarg.) Raup

RL., open black spruce forest, trees 30 feet high, Nos. 2005 and 2007; RL., sandy terrace, tree 15 feet high, No. 2176; NL., flank of sandy esker, tree 20 feet high, No. 2243; RL., tree 50 feet high, 14 inches in diameter at butt, growing over creek outlet, No. 2402. Occurs commonly in mixed forest and along shores reaching its greatest size where moisture and drainage conditions are good, particularly at the outlets of creeks.

B. papyrifera Marsh. ? var. **cordifolia** (Regal) Fern.

RL., gravel ridge between lake and bog, tree 45 feet high, 14 inches in diameter at butt, No. 2404.

B. papyrifera Marsh. var.

NL., flank of sandy esker, tree 15 feet high, with pendulous branches, No. 2241.

B. occidentalis Hook.

NL., bare bouldery knoll, bush 5 feet high, No. 2186; RL., raised sandy beaches, bush 6 feet high, No. 2416.

B. glandulosa Michx.

RL., flooded shore of black spruce forest, bush 5 feet high, No. 2018; NL., bare knoll, bush 3 feet high, No. 2194.

Alnus crispa (Ait.) Pursh

CR., thicket around small sandy lake, No. 2052; NL., gravel spit, No. 2220; NL., river-bank at falls, No. 2273; RL., thicket on lakeshore, No. 2382.

A. rugosa (DuRoi) Spreng, var. **americana** (Regel) Fern.

CR., stony shore of bay, No. 2055; RL., lakeshore, No. 2398.

Geocaulon lividum (Richards.) Fern.

RL., open black spruce forest, No. 2009; NL., flank of barren gravel ridge, No. 2233; RL., open jack pine forest, No. 2375. Occurs commonly and frequently throughout our area.

Rumex fenestratus Greene

CR., old camp-site at river bend, No. 2102.

Polygonum aviculare L.

CR., wet river-bank, No. 2131.

P. amphibium L. var. **stipulaceum** (Coleman) Fern.

CR., wet river-bank, No. 2132.

P. amphibium L. var. **stipulaceum** (Coleman) Fern. forma **fluitans** (Eat.) Fern.

CR., river through silted marsh, No. 2100; NL., sheltered bay, No. 2300; RL., bay flooded by dammed lake, No. 2356; RL., inland lake, No. 2427.

P. lapathifolium L. var. **salicifolium** Sibth.

RL., lakeshore at old camp-site, No. 2316; RL., gravel ridge between lake and bog, No. 2406.

Chenopodium album L.

RL., sandy terrace around settlement, No. 2160.

Sagina nodosa (L.) Fenzl.

CR., on mud, No. 2118.

Stellaria longipes Goldie var. **Edwardsii** (R. Br.) Wats.

NL., barren exposed island, No. 2306.

Stellaria longifolia Muhl.

CR., grassy point, old camp-site, No. 2061; RL., ditch through clearing, No. 2326; RL., black spruce woods on gneiss substrate, No. 2369.

S. calycantha (Ledeb.) Bong.

NL., wet black spruce woods beside falls, No. 2271.

S. calycantha (Ledeb.) Bong. var. **floribunda** Fern.

CR., grassy meadow on lakeshore, old camp-site, No. 2094; RL., black spruce woods on gneiss substrate, No. 2370.

Nuphar variegatum Engelm.

RL., flooded bay at creek outlet, No. 2330. Although collected but once, and seen rarely on the main waterways, it was observed from the air in great abundance in many apparently landlocked lakes.

Ranunculus trichophyllus Chaix

RL., flooded bay at creek outlet, No. 2332.

R. trichophyllus Chaix var. **eradicatus** (Laestad.) W. B. Drew
CR., at cutting through sandy esker, Nos. 2107 and 2109.

R. lapponicus L.
RL., open black spruce bog, No. 2339.

R. reptans L.
CR., marshy shore of island, No. 2096; CR., on mud, No. 2117; NL., silted shore, No. 2223; NL., silted pond, No. 2285.

Caltha natans Pall.
RL., outlet creek from inland lake, No. 2426.

Corydalis sempervirens (L.) Pers.
CR., rock crevices on granite hill, No. 2074; CR., dry sandy shore, No. 2121; RL., ledges of basic intrusive rocks, No. 2150; RL., lakeshore at old camp-site, No. 2320.

Draba nemorosa L. var. **lejocarpa** Lindbl.
CR., grassy meadow on lakeshore at old camp-site, No. 2095; RL., sandy terrace around settlement, No. 2157. Abundant at these two localities but rare elsewhere in our area.

Lepidium densiflorum Schrad.
RL., sandy terrace around settlement, Nos. 2161 and 2430.

Subularia aquatica L.
RL., inland lake, silted sandy bottom, 3 feet deep, No. 2439. Locally abundant.

Capsella Bursa-pastoris (L.) Medic.
RL., sandy terrace around settlement, No. 2159.

Rorippa islandica (Oeder) Borbas var. **Fernaldiana** Butt. & Abbe
RL., silted shore, No. 2138.

Barbarea orthoceras Ledeb.
RL., flooded shore of black spruce forest, No. 2017; CR., wet bank below grassy meadow, No. 2091; NL., gravel spit, No. 2210, NL., shore of pond, No. 2283. Frequent throughout our area on sandy and silted shores.

Cardamine pensylvanica Muhl.
CR., muddy river shore, No. 2044; CR., wet bank below grassy meadow, No. 2092.

Drosera rotundifolia L.
RL., open sphagnum bog around small lake, No. 2371.

Saxifraga tricuspidata Rottb.
RL., ledges of basic intrusive rocks, No. 2151; NL., flank of gravel ridge, No. 2254.

Parnassia Kotzebuei Cham.
CR., wet bank below grassy meadow, No. 2090.

Ribes glandulosum Grauer
RL., open black spruce forest near shore, No. 2011; NL., foot of gravel ridge, No. 2253; RL., black spruce woods beside rapids, No. 2349.

R. triste Pall.
NL., wet black spruce woods beside falls, No. 2269.

R. hudsonianum Richards.
CR., black spruce woods beside falls, No. 2080; RL., black spruce woods beside rapids, No. 2348.

Potentilla tridentata Ait.
CR., dry sandy shore, No. 2122; RL., on ledges of basic intrusive rocks, No. 2147.

P. palustris (L.) Scop.
RL., edge of flooded bay, No. 2329.

P. palustris (L.) Scop. ? var. **parvifolia** (Raf.) Fern. & Long
NL., gravel spit, No. 2217.

P. norvegica L.
CR., sandy beach, No. 2059; NL., gravel spit, No. 2209; RL., sandy terrace around settlement, No. 2434. Frequent throughout our area on sandy shores.

Geum macrophyllum Willd. var. **perincisum** (Rydb.) Raup
RL., sandy bank at lakeshore of settlement, No. 2438.

Rubus Chamaemorus L.
RL., open black spruce forest, wet place, in sphagnum, No. 2012.

R. paracaulis Bailey
NL., wet black spruce woods beside falls, No. 2261.

R. acaulis Michx.
CR., wet ground at end of portage, No. 2085; NL., wet black spruce woods, No. 2184.

R. idaeus L. var. **canadensis** Richards.
CR., grassy meadow on lakeshore, old camp-site, No. 2093; NL., foot of gravel ridge, No. 2256.

R. idaeus L. var. **strigosus** (Michx.) Maxim.
RL., open black spruce forest, No. 2023.

Prunus pensylvanica L. f.
RL., open black spruce forest, No. 2024; CR., open black spruce forest, stony ground, No. 2046; RL., stony ground at edge of clearing, No. 2322.

Callitriche anceps Fern.
CR., wet river bank, No. 2129.

Empetrum nigrum L.
RL., open black spruce forest, No. 2008; NL., flank of bouldery knoll, No. 2182.

Viola palustris L.
NL., wet black spruce woods beside falls, No. 2264; NL., silted lakeshore, No. 2297; RL., black spruce woods beside rapids, No. 2346.

V. pallens (Banks) Brainerd
CR., willow thicket at lakeshore, No. 2072.

Epilobium angustifolium L.

CR., sandy beach, No. 2058; RL., sandy terrace around settlement, No. 2175; NL., lakeshore, No. 2190; NL., portage through open spruce woods, No. 2260.

E. palustre L.

CR., portage through black spruce forest, No. 2136; NL., river shore beside falls, No. 2262; RL., black spruce woods beside rapids, No. 2347; RL., black spruce woods on gneiss substrate, No. 2368.

E. palustre L. var. **oliganthum** (Michx.) Fern.

RL., open black spruce bog, No. 2336.

E. glandulosum Lehm. var. **adenocaulon** (Haussk.) Fern.

RL., lakeshore at old camp-site, No. 2315; RL., black spruce woods beside rapids, No. 2347A.

Myriophyllum alternifolium DC.

CR., at cutting through sandy esker, No. 2106; RL., inland lake, silted sandy bottom, 3 feet deep, No. 2442.

Hippuris vulgaris L.

CR., on mud, No. 2120; NL., marsh, No. 2225.

H. vulgaris L. forma **fluviatilis** L.

RL., creek through marsh, submersed, No. 2049.

Aralia nudicaulis L.

RL., on gravel beside creek, No. 2395.

Cicuta bulbifera L.

RL., marsh flooded by dammed lake, No. 2389.

C. mackenzieana Raup

RL., silted shore, No. 2140; RL., flooded and silted lakeshore, No. 2321. Spreading abundantly over the flooded shores of Reindeer Lake but not seen elsewhere.

Sium suave Walt.

CR., silted shore, No. 2108.

Cornus canadensis L.

CR., open black spruce forest, stony ground, No. 2047; NL., open black spruce woods. No. 2259.

Pyrola secunda L.

RL., burned black spruce forest, No. 2379; RL., black spruce forest on rocky substrate, No. 2399.

P. secunda L. var. **obtusata** Turcz.

CR., black spruce woods beside falls, No. 2082; NL., wet bank beside falls, No. 2257A.

P. minor L.

CR., black spruce woods beside falls, No. 2083; RL., between ridges of basic intrusive rocks, No. 2153; NL., gravel spit, No. 2208; NL., wet bank beside falls, Nos. 2257 and 2258; RL., black spruce forest on rocky substrate, No. 2397.

P. virens Schweigger
RL., black spruce woods on gneiss substrate, No. 2367.

Pyrola grandiflora Rad. var. **canadensis** (Andres.) Porsild
NL., wet black spruce woods, No. 2282.

Ledum groenlandicum Oed.
RL., open black spruce forest, rocky outcrop, No. 2030; NL., open black spruce woods, No. 2181; RL., open jack pine forest, No. 2377.

L. decumbens (Ait.) Lodd.
CR., northern slope of granite hill, No. 2081; NL., bare hillock, No. 2231.

Loiseleuria procumbens (L.) Desv.
NL., bare knoll, No. 2203.

Kalmia polifolia Wang.
RL., muskeg around small lake, No. 2028; NL., boggy shore, No. 2180.

Andromeda Polifolia L.
RL., muskeg around small lake, in sphagnum, No. 2035; NL., silted lakeshore, No. 2189.

Chamaedaphne calyculata (L.) Moench. var. **angustifolia** (Ait.) Rehd.
RL., muskeg around small lake, No. 2027.

C. calyculata (L.) Moench ? var. **latifolia** (Ait.) Fern.
NL., boggy lakeshore, No. 2294.

Arctostaphylos Uva-ursi (L.) Spreng.
NL., flank of sandy esker, No. 2242; RL., black spruce forest on rocky substrate, No. 2400.

Arctostaphylos Uva-ursi (L.) Spreng. var. **adenotricha** Fern. & Macbr.
RL., open black spruce forest, No. 2026.

A. alpina (L.) Spreng.
NL., barren stony hillside, No. 2301.

A. rubra (Rehd. & Wils.) Fern.
NL., barren stony hillside, No. 2301A.

Vaccinium uliginosum L.
RL., open black spruce forest, No. 2010; RL., raised sandy beaches flooded by dammed lake, No. 2425.

V. uliginosum L. var. **alpinum** Bigel.
NL., barren exposed island, No. 2307.
NL., open black spruce woods, No. 2187.

V. myrtilloides Michx.
RL., open black spruce forest, No. 2025; RL., on ridges of basic intrusive rocks, No. 2146; NL., sandy opening in black spruce woods, No. 2291.

V. Vitis-Idaea L. var. **minus** Lodd.

RL., open black spruce forest, No. 2006; NL., flank of bouldery knoll, No. 2183; RL., open jack pine forest, No. 2376. One of the commonest plants of our area.

Oxycoccus microcarpus Turcz.

RL., muskeg around small lake, No. 2029; NL., boggy ground, No. 2312; RL., open sphagnum bog around small lake, No. 2372.

Lysimachia thyrsiflora L.

RL., flooded and silted lakeshore, No. 2314; RL., bay, flooded by dammed lake, submersed form, No. 2363. Locally frequent with *Cicuta mackenzieana* on the flooded shore of Reindeer Lake.

Trientalis borealis Raf.

RL., black spruce woods beside rapids, No. 2345.

Menyanthes trifoliata L. var. **minor** Raf.

RL., marsh flooded by dammed lake, No. 2354; RL., muskeg around small lake, No. 2033.

Scutellaria epilobiifolia A. Hamilton

RL., on gravel among boulders beside creek, No. 2393. With the following species seen only at one locality.

Lycopus uniflorus Michx.

RL., on gravel among boulders beside creek, No. 2394.

Veronica scutellata L.

NL., muddy bank of pond, No. 2285A.

Euphrasia sp.

NL., sheltered side of gravel spit, No. 2216. Too immature for specific determination.

Utricularia vulgaris L.

RL., off edge of muskeg around small lake, No. 2032; CR., marshy outlet from lake, No. 2069; RL., bay, flooded by dammed lake, No. 2355; RL., creek outlet, No. 2359.

U. intermedia Hayne

RL., off edge of muskeg around small lake, No. 2032A; CR., marshy outlet from lake, No. 2069A; NL., marsh, No. 2226.

Pinguicula villosa L.

NL., boggy ground, No. 2311; RL., open sphagnum bog around small lake, No. 2373.

Galium trifidum L.

CR., marshy shore of island, No. 2097; NL., wet black spruce woods beside falls, No. 2263; RL., edge of marsh, No. 2357.

Linnaea borealis L. var. **americana** (Forbes) Rehd.

NL., flank of sandy esker, No. 2344.

Viburnum edule (Michx.) Raf.

CR., below steep flank of sandy esker, No. 2071; NL., foot of sandy esker, No. 2245; RL., gravel ridge between lake and bog, No. 2405.

Erigeron angulosus Gaudin var. **kamtschaticus** (DC.) Hara
RL., sandy terrace around settlement, No. 2162; NL., sandy opening in black spruce woods, No. 2290; RL., No. 2429. (mature specimens from same place as No. 2162.)

Antennaria isolepis Greene
NL., gravelly shore, No. 2310.

A. rosea (Eaton) Greene
CR., portage through black spruce forest, Nos. 2125 and 2133.

Achillea Millefolium L.
RL., sandy terrace around settlement, No. 2158.

Matricaria matricarioides (Less.) Porter
RL., sandy terrace around settlement, No. 2431.

Artemisia canadensis Michx.
NL., gravel ridge, No. 2252.

Petasites palmatus (Ait.) Gray
CR., willow-alder thicket, No. 2112; NL., wet black spruce woods, No. 2281; RL., Paskwachi river-bank, No. 2409.

Arnica lonchophylla Greene ssp. **genuina** Maguire
NL., flank of gravel ridge, No. 2275.

Hieracium umbellatum L.
RL., grassy point on island, No. 2378.

ACKNOWLEDGMENTS

The writer wishes to acknowledge the assistance of Alex Cook of Brochet, Man., who was an excellent guide and an able field helper. To Mr. W. R. Garbutt, manager of the Hudson's Bay Company Post, and to Mrs. Garbutt, the writer is most grateful for many kindnesses, for hospitality, and for advice on local conditions and outfitting.

The Chief Botanist of the National Museum, Mr. A. E. Porsild, checked my determinations of the specimens. Dr. H. J. Scoggan advised upon the field work and the preparation of this report. To both these officers the writer gratefully expresses his indebtedness.

REFERENCES

1. Dominion Forest Service. Native trees of Canada. Bull. 61, fourth edition, 293 pp. 1949.
2. Downes, P.G. Sleeping Island. Coward-McCann, New York. 296 pp. 1943.
3. Gadd, N. R. Brochet, Man. Geol. Surv., Canada, Map 1001A. 1948.
4. Geological Society of America. Glacial Map of North America, west half, first edition. 1945.
5. Greenlees, Stephen. Filming the northland. The Beaver, Outfit 281, pp. 24-27. 1951.
6. Halliday, W. E. D. A forest classification for Canada. Lands, Parks and Forests Branch, Canada, Forest Service Bull. 89, pp. 5-50. 1937.
7. Harper, Francis. In caribou land. Natural History, Vol. 58, pp. 224-231, 239, 240. 1949.

8. Mines and Geology Branch. Geological map of the Dominion of Canada, west half, Dept. of Mines and Resources, Canada, Map 820A. 1945.
9. Porsild, A. E. Vascular plants of Nueltin Lake, Northwest Territories. National Museum of Canada, Bull. 118, pp. 72-83. 1950.
10. Scoggan, H. J. Botanical investigations in Central Manitoba. National Museum of Canada, Bull. 118, pp. 84-92. 1950.
11. ———Botanical investigations along the Hayes River route, northern Manitoba. National Museum of Canada, Bull. 123, pp. 139-161. 1951.
12. ———Botanical investigations in Manitoba in 1950. National Museum of Canada, Bull. 126, pp. 208-227. 1952.
13. Tyrrell, J. B. Report on the Doobaunt, Kazan, and Ferguson Rivers and the North-West Coast of Hudson Bay and on two overland routes from Hudson Bay to Lake Winnipeg. Geol. Surv., Canada, Ann. Rept. Vol. 9, 218F pp. 1896.

LIST OF PLANTS COLLECTED ON PRINCE CHARLES AND AIR FORCE ISLANDS IN FOXE BASIN, NORTHWEST TERRITORIES

By W. K. W. Baldwin

The Foxe Basin Expedition of 1949 on the C.G.M.V. *Nauja* provided an opportunity for plant collecting in an area which is little known botanically, on islands previously uncharted. The discovery of these islands has already been described (1), and an account has been published of the 1949 voyage (2). The accompanying sketch map shows the position of the islands in Foxe Basin and the localities where collections were made. A further report has been made (3) giving a summary of the biological investigations undertaken during the whole voyage. The present paper is confined to the collections made on Prince Charles and Air Force Islands from August 15th to 25th, 1949. Collections were made at three different places, which appeared to give good samples of the flora of the area as far as could be judged by coastal observation and a study of air photographs.

PLATE XXX

View parallel to south coast of Prince Charles Island. Mats of salt-marsh plants forming a carpet on the mud behind the rubble beach on which the tent stands.

COLLECTING STATIONS AND MAJOR HABITATS

The first landing was made near the southwest point of Prince Charles Island. Coastal waters are shallow and rich in large Laminaria. The usual Fucus strand line occurred along the seaward side of the beach which had no littoral vegetation. The crest of the rubble beach was largely

barren, having only on its landward side, above high-water mark, some scattered colonies of *Saxifraga oppositifolia* and *Papaver radicatum*. On the sheltered landward slope from the crest of the beach, the chief plants were *Saxifraga cernua, Alopecurus alpinus, Arctagrostis latifolia, Poa abbreviata, Festuca brachyphylla, Cochlearia officinalis* ssp. *arctica, Draba Bellii* and *Draba cinerea*.

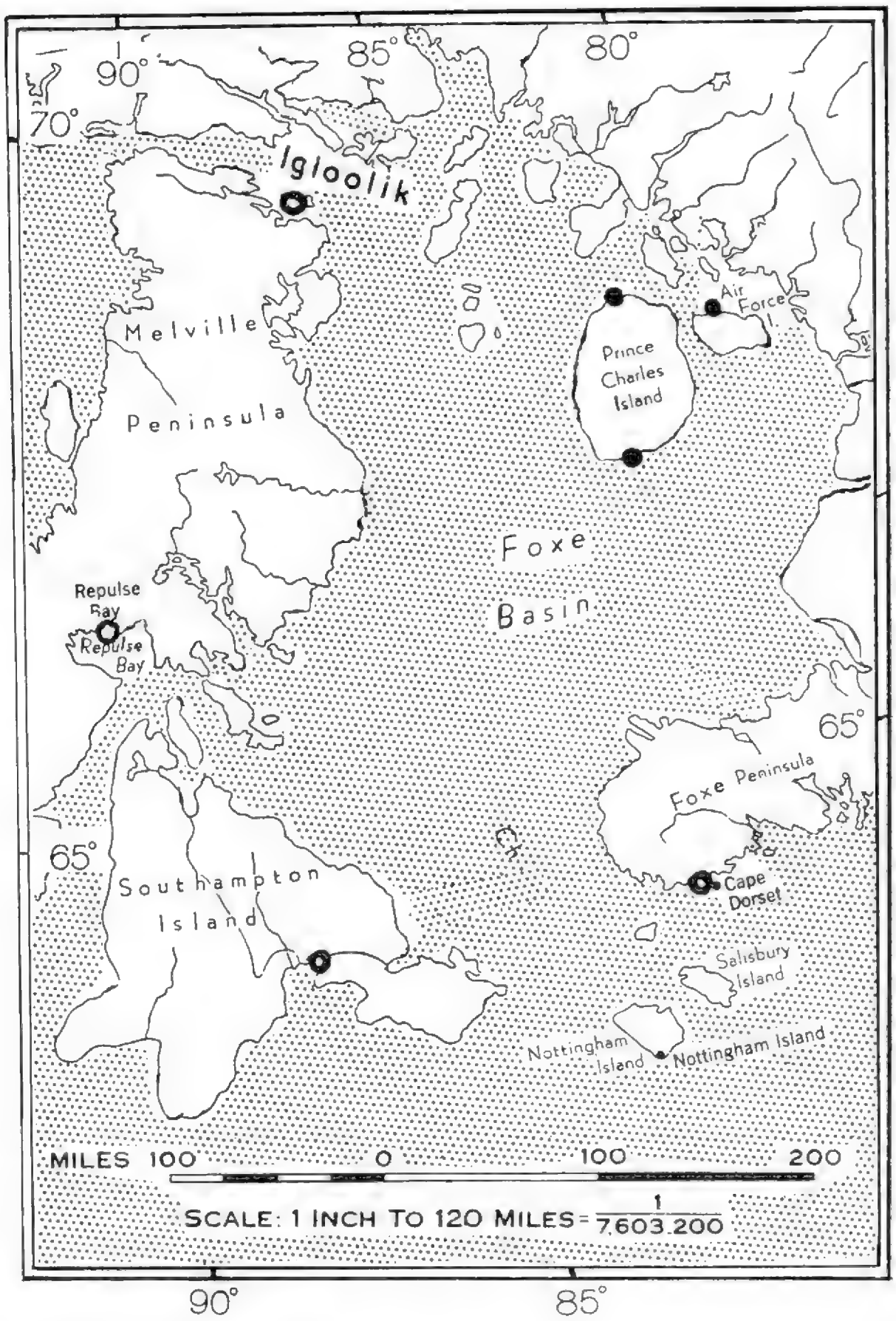


Figure 9. Sketch map of Foxe Basin showing Prince Charles Island and Air Force Island. Solid dots show localities where collections were made.

Lying in a long narrow depression, just on the land side of the beach, is a salt-marsh dominated by three plants: *Carex ursina, Puccinellia phryganodes,* and *Stellaria humifusa.* These plants continued inland around muddy shallow ponds which were brackish for about half a mile from the coast.

The interior of the island is a low plain dotted with shallow pools and lakes. Nowhere does the land rise more than 50 feet above sea-level, presenting everywhere a monotonous repetition of the same plant habitats. Strand lines form low gravel ridges between extensive wet sedge and grass meadows. Here the chief sedges were *Carex stans,* often in extensive pure stands, and *Carex membranacea.* The commonest grasses were *Hierochloe pauciflora, Dupontia Fisheri, Poa alpigena* var. *prolifera, Poa arctica* var. *vivipara,* and *Alopecurus alpinus.* Around a few of the pools grew two species of cotton grass (*Eriophorum Scheuchzeri* and less frequently *E. angustifolium*).

The vegetation of the rubble beach was repeated inland along the gravelly crests of the strand lines. The richest vegetation, however, occurred where the flanks of the strand lines sloped down to grassy meadows around the pools. Here grew a few dwarf willows (*Salix arctica* and *S. reticulata*), a few patches of *Dryas integrifolia, Stellaria longipes, Draba alpina, D. lactae* and *D. nivalis, Pedicularis hirsuta,* and *Melandrium apetalum.* Around the pools were wet areas conspicuously dotted with

PLATE XXXI

Pool with cotton grass (*Eriophorum Scheuchzeri*) surrounded by wet sedge and grass meadow. Low gravel ridge at right background. One mile inland, south coast of Prince Charles Island.

Cardamine pratensis var. *angustifolia* and *Senecio congestus*. Extensive patches of the attractive little grass, *Pleuropogon Sabinei*, occurred on open muddy area near the pools.

A second landing was made at the northwest point of Prince Charles Island. Again the landscape is low and flat. At this point, the disintegrated limestone of the bedrock is more frequently exposed in barren humps above the same extensive sedge meadows. Around pools on these exposures were patches of *Arctophila fulva*. The disintegrated surface limestone had scattered individuals of *Luzula nivalis* not collected at the first camp-site. In a pool under a low limestone ledge was a striking colony of a buttercup (*Ranunculus sulphureus*.) The richest vegetation occurred around the rims of the shallow pools. Here *Chrysosplenium tetrandrum* was locally abundant with *Salix herbacea*.

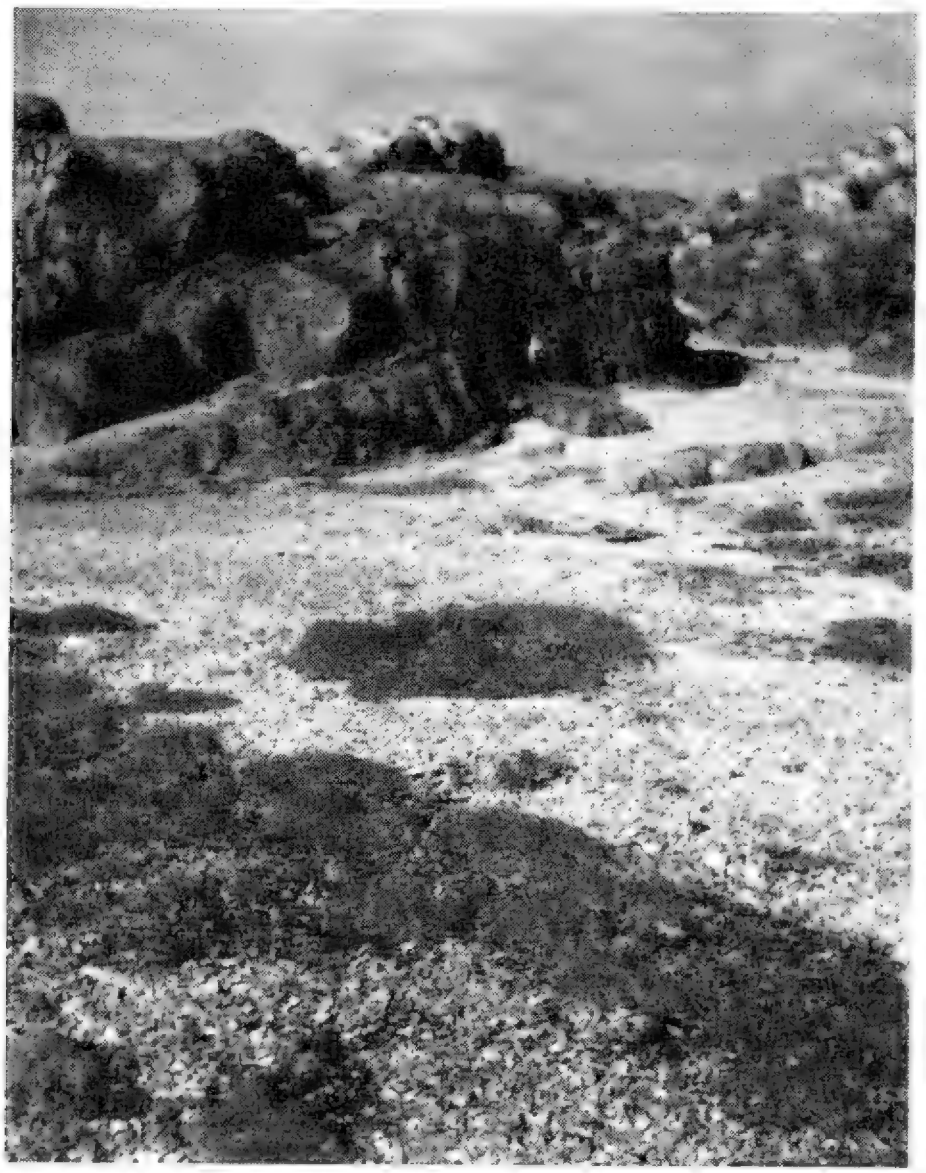
PLATE XXXII

Pool on disintegrated limestone at northern end of Prince Charles Island. Note tall grass (*Arctophila fulva*) on the margin, and another grass (*Arctagrostis latifolia*) in foreground.

A third landing was made on the northwest point of Air Force Island. The southern part of this island is flat and dotted with pools like Prince Charles Island. Again the wet sedge meadows had only two chief sedges (*Carex stans* and *C. membranacea*). At our camp-site on the north shore the surface of the land is rocky, largely barren, with many large boulders

and a few sheltered pools. In a group of these rocky pools the only collection of *Equisetum variegatum* was made and, at the margin of the pool, of *Eutrema Edwardsii*.

PLATE XXXIII



Rocky hill above raised beach at northern end of Air Force Island with mats of *Dryas integrifolia* and very dark patches of *Saxifraga oppositifolia*.

At the northern end of the island, a flattish coastal area, which is 25 to 30 feet above sea-level, is flanked by one to two miles of hills of granitic textured rocks, cut by a diabase dike. These rocky hills rise 120 to 135 feet above sea-level and provide a very different habitat from those described on Prince Charles Island. At the foot of the rocky hills was a girdle of *Cassiope tetragona* which occurred nowhere else on the two islands. Here too were found *Epilobium latifolium*, abundant *Dryas integrifolia*, *Saxifraga tricuspidata*, and *Oxyria digyna*. Eleven species of plants occurred on gravel slopes in the rocky hills which were not seen elsewhere on the two islands. These included *Lycopodium Selago*, *Trisetum spicatum* var. *Maidenii*, *C. nardina* var. *atriceps*, *Juncus biglumis*, *Luzula confusa*, *Silene acaulis* var. *exscapa*, *Lesquerella arctica*, *Arabis arenicola*, *Empetrum nigrum* var. *hermaphroditum*, *Pyrola grandiflora*, and *Vaccinium uliginosum* var. *alpinum*.

DISCUSSION

Although the islands were generally well covered with vegetation, chiefly the characteristic wet meadows of grass and sedge, there was little variety of habitat. The largest island, Prince Charles, was uniformly low and flat, being composed of disintegrated limestone, worked by wave action and later raised a little above sea-level. Only at the northern end of Air Force Island was there any high land where rocky granite hills rose not much over 100 feet above sea-level. The list of species collected is relatively small and is typical of these habitats. Only one range extension was noted and that was for an aquatic buttercup (*Ranunculus subrigidus*) about 900 miles north of its previously known range.

In the list which follows there are 75 species and major varieties of vascular plants. This may be compared with 235 species listed by Nicholas Polunin (4) from Baffin Island, the nearest land mass to these islands which lie close to its west coast. The collection from the two islands consists of 110 numbers deposited at the National Herbarium of Canada, together with duplicates amounting to 525 herbarium sheets. Supplementary to the vascular plants, 15 collections of arctic rock lichens were made besides 27 samples of the arctic poppy for genetic studies.

Abbreviations used in the list are given below along with locations and dates.

Ch. S.–Prince Charles Island, south shore about latitude 67° 10′ N., longitude 76° 43′ W. August 15-18, 1949.

Ch. N.–Prince Charles Island, north shore about latitude 68° 21′ N., longitude 76° 20′ W. August 20-21, 1949.

A. F.–Air Force Island, north shore about latitude 68° 08′ N., longitude 74° 12′ W. August 23-25, 1949.

PLANT LIST

Equisetum variegatum Schleich.

A. F., only in a few pools in rocky plain, No. 1965.

Lycopodium Selago L.

A. F., gentle slope on rocky hill, stems 1-4 cm. high, No. 1973.

Hierochloe pauciflora R. Br.

Ch. S., abundant in wet meadows around pools, No. 1932; Ch. N., common around shallow pools, No. 1945.

Alopecurus alpinus Sm.

Ch. S., widespread from rubble beach to inland lakes, No. 1896; Ch. N., on disintegrated limestone, No. 1944.

Arctagrostis latifolia (R. Br.) Griseb.

Ch. S., frequent near rubble beach, No. 1897; Ch. N., common on disintegrated limestone, No. 1952.

Deschampsia pumila (Ledeb.) Ostenf.

Ch. S., in low clumps between rubble beach and salt marsh, Nos. 1898 and 1900.

Trisetum spicatum (L.) Richter var. **Maidenii** (Gandoger) Fern.
A. F., gravelly slopes from raised beach to hilltop, Nos. 1972 and 1991.

Pleuropogon Sabinei R. Br.
Ch. S., forming extensive patches on open muddy areas around shallow pools, No. 1929.

Poa alpigena (Fries) Lindm. f. **prolifera** Simm.
Ch. S., scattered patches around shallow pools, No. 1923.

Poa arctica R. Br.
Ch. N., around shallow pools on disintegrated limestone No. 1954; A. F., gentle slopes on rocky hillside, No. 1985.

P. arctica R. Br. var. **vivipara** Hook.
Ch. S., forming meadows in low areas between gravel ridges, No. 1935.

P. abbreviata R. Br.
Ch. S., common on rubble beach, No. 1891; Ch. N., abundant on ridges of disintegrated limestone, No. 1950.

Arctophila fulva (Trin.) Rupr.
Ch. N., forming tall stands on muddy margins of shallow pools, No. 1948.

Dupontia Fisheri R. Br.
Ch. S., common in less wet meadows between shallow lakes, No. 1933.

Puccinellia phryganodes (Trin.) Scribn. & Merr.
Ch. S., sterile mats on wet day, common around shallow brackish pools near coast, No. 1915.

Festuca brachyphylla Schultes
Ch. S., on barren gravel beach, No. 1893.

Eriophorum angustifolium Honckeny
Ch. S., around shallow pools, No. 1922. A. F., locally common along watercourse down rocky hill, No. 1976.

E. Scheuchzeri Hoppe
Ch. S., around shallow pools and mud flats, No. 1920.

Carex nardina Fries var. **atriceps** Kük.
A. F., gravelly areas on lower slopes of rocky hill, Nos. 1971 and 1966.

C. ursina Dew.
Ch. S., dominant in saltmarsh enclosed by rubble beach, No. 1903.

Carex scirpoidea Michx.
A. F., gentle slopes on rocky hillside, No. 1984.

C. misandra R. Br.
Ch. S., gravel ridges inland, No. 1940; A. F., along gravelly raised beach, No. 1969.

C. atrofusca Schk.
A. F., low rocky plain, No. 1967.

C. stans Drej.
Ch. S., wet sedge meadows between the shallow lakes which are the chief feature of the interior of the island, No. 1930; A. F., wet sedge meadows of low coastal plain, No. 1968.

C. subspathacea Wormsk.
Ch. S., mud flats around shallow pools near coast, No. 1911.

C. membranacea Hook.
Ch. S., wet sedge meadows between shallow lake, No. 1913; A. F., the commonest sedge in the wet meadows of the low coastal plain, No. 1978.

Juncus biglumis L.
A. F., along gravelly watercourse down rocky hill, No. 1979.

Luzula nivalis (Laest.) Beurl.
Ch. N., on disintegrated limestone, No. 1942; A. F., gravelly slopes in rocky hill, No. 1981.

L. confusa Lindeb.
A. F., gravelly slopes in rocky hill, No. 1983.

Salix reticulata L.
Ch. S., on slopes of gravel ridges one mile inland, No. 1938; A. F. low rocky plain, No. 1959 and more luxuriant at foot of rocky hillside, No. 1974.

S. herbacea L.
Ch. N., rim of shallow pool, infrequent, No. 1943.

S. arctica Pall.
Ch. S. drier ground between pools, No. 1908 and slopes of gravel ridges No. 1936; Ch. N., on disintegrated limestone, No. 1947; A. F., wet rocky coastal plain Nos. 1960 and 1988.

Oxyria digyna (L.) Hill
A. F., on gravelly slopes at foot of rocky hill, No. 1964.

Polygonum viviparum L.
Ch. S., between pools of interior plain, No. 1928.

Stellaria humifusa Rottb.
Ch. S., salt-marsh and mud flats close to coast, abundant, No. 1901.

S. ? crassifolia Ehrh.
Ch. S., rim of shallow pool No. 1917, with *Ranunculus hyperboreus.*

S. longipes Goldie var. **Edwardsii** (R. Br.) S. Wats.
Ch. S., around shallow ponds, No. 1931; Ch. N., disintegrated limestone bank around pool No. 1956.

Cerastium beeringianum C. & S.
Ch. S., mud below gravel ridge, No. 1902, and slopes of inland gravel ridges, No. 1932; A. F., beside shallow pool on disintegrated limestone No. 1953.

Arenaria Rossii R. Br.
Ch. S., only one colony found, on gravel ridge, No. 1939.

A. peploides L.
Ch. S., on gravel ridge half mile inland, infrequent, No. 1941.

Silene acaulis L. var. **exscapa** (All.) DC.
A. F., around dried up pools on rocky hill, Nos. 1990 and 1992.

Melandrium apetalum (L.) Fenzl
Ch. S., around ponds in gravelly area, No. 1921.

Ranunculus subrigidus W. B. Drew
(*R. circinatus* of Am. authors, not Sibth.)
Ch. S., margin of shallow muddy pool, No. 1914.
This collection represents a range extension of about 900 miles north from a collection from Ontario: Cape Henrietta Maria, July 23, 1948, W. Y. Watson, No. 121 (In National Herbarium of Canada) det. A. E. Porsild.

R. hyperboreus Rottb.
Ch. S., growing luxuriantly on mossy rim of shallow pool, No. 1916.

R. sulphureus Solander
Ch. N., in shallow pond below exposure of limestone bedrock 4 feet thick, No. 1958.

Papaver radicatum Rottb.
Ch. S., common along rubble beach and inland gravel ridges, No. 1892; Ch. N., disintegrated limestone ridges, No. 1951.

P. radicatum Rottb. var. **albiflorum** Lange
Ch. S., less common than yellow form, growing similarly along gravel ridges inland, No. 1905.

Cochlearia officinalis L. ssp. **arctica** (Schlecht.) Hult.
Ch. S., rubble beach, No. 1894, and inland on mud and gravel around shallow pools, No. 1904.

Eutrema Edwardsii R. Br.
A. F., margins of muddy pools on rocky coastal plain, No. 1970.

Cardamine pratensis L. var. **angustifolia** Hook.
Ch. S., common in sedge and grass meadows around pools, No. 1926.

Lesquerella arctica (Wormsk.) Wats.
A. F., found only once, in drying mud on gravelly slopes of rocky hill, No. 1987.

Draba alpina L.
Ch. S., drier places between shallow pools, No. 1927.

D. Bellii Holm
Ch. S., common along rubble beach, No. 1888 and on gravel ridges inland, No. 1924.

D. lactea Adams
Ch. S., slopes of gravel ridges inland, No. 1925A; A. F., gravelly slopes of rocky hill, No. 1993.

D. nivalis Lilj.
Ch. S., slopes of gravel ridges inland, No. 1925.

D. cinerea Adams
Ch. S., common along rubble beach, No. 1890.

Arabis arenicola (Richards.) Gel.
A. F., gravelly slopes on rocky hillside, No. 1989.

Saxifraga hieracifolia Waldst, and Kit.
Ch. S., mossy margin of shallow pool, No. 1906; A. F., beside pool below rocky ledge, No. 1995.

Saxifraga nivalis L.
Ch. S., muddy areas between gravel ridges, No. 1919.

S. Hirculus L.
Ch. S., common near shallow muddy pools, No. 1807; Ch. N., abundant near shallow pools on disintegrated limestone, No. 1955.

S. cernua L.
Ch. S., common on rubble beach and gravel ridges inland, No. 1895.

S. caespitosa L.
Ch. S., depressions behind rubble beach, No. 1899.
Ch. S., along inland side of rubble beach, No. 1887.

S. tricuspidata Rottb.
A. F., gravelly slopes at foot of rocky hill, No. 1963.

S. oppositifolia L.
Ch. S., the only plant on the crests of the rubble beach and the gravel ridges inland, No. 1889; Ch. N., very common on disintegrated limestone, No. 1949.

Chrysosplenium tetrandrum (Lund) Fries
Ch. S., locally abundant in mossy depressions, No. 1909; Ch. N., growing luxuriantly in mossy areas around shallow pools, No. 1957.

Dryas integrifolia M. Vahl
Ch. S., uncommon, sides of gravel ridges one mile inland, No. 1937; A.F., common on gravel slopes on rocky hill, No. 1975.

Empetrum nigrum L. var. **hermaphroditum** (Lange) Sorensen
A. F., found only on gravel slopes in rocky hill, No. 1980.

Epilobium latifolium L.
A.F., near crest of raised beach where locally abundant and fruiting heavily, No. 1962.

Pyrola grandiflora Rad.
A.F., only one colony found in sheltered place near top of rocky hill, No. 1986.

Cassiope tetragona (L.) D. Don
A.F. on gravel close to rocky side of hill above raised beach, No. 1961.

Vaccinium uliginosum L. var. **alpinum** Bigel.
A.F. on gravel slopes along water course through rocky hill, No. 1982.

Pedicularis hirsuta L.
Ch. S. sides of gravel ridges, No. 1918.

Matricaria ambigua (Ledeb.) Kryl.
A.F., found only once at one of the few sandy places at the seashore, No. 1994.

Senecio congestus (R. Br.) DC.
Ch. S., common and a conspicuous feature of wet depressions, No. 1910; Ch. N., around shallow pools on disintegrated limestone, No. 1946; A. F., wet places on rocky coastal plain, No. 1977.

ACKNOWLEDGMENTS

The writer wishes to express his thanks to the leader, Mr. T. H. Manning, and to the five other members of the field party for their assistance in the botanical work of the expedition. For geological data the writer is indebted to Mr. C. A. Burns, geologist of the field party. Acknowledgment is gratefully made to Mr. A. E. Porsild, Chief Botanist of the National Museum of Canada, for his help in checking determinations of the specimens and in preparing this paper.

REFERENCES

1. Discovery of two islands in eastern Foxe Basin. The Arctic Circular, Vol. I, No. 7, pp. 73-75, November, 1948.
2. The voyage of the C.G.M.V. *Nauja* to Foxe Basin in 1949. The Arctic Circular, Vol. III, No. 3, pp. 26-31, September, 1950.
3. Baldwin, W.K.W. Biological investigation on the 1949 Foxe Basin expedition. Nat. Mus., Canada, Bull., 123, pp. 162-165, 1951.
4. Polunin, N. Botany of the Canadian Eastern Arctic. Pt. 1; Nat. Mus. Canada Bull, 92:1-408, 1940.

PLANTS FROM TWO SMALL ISLAND HABITATS IN JAMES BAY

By W. K. W. Baldwin

Botanical interest in the James Bay area has been aroused by many distinctive features of this region. The gradual disappearance of southern plants as they reach their northern limits and the great contrast between the subarctic tundra of the islands and the northern forest of the nearby mainland were the subjects of the first botanical discussion of the region by James M. Macoun (1888). Far more striking are the physiographic and floristic differences between the east and west shores.

To explain certain peculiar patterns of plant distribution, Potter (1932) suggested the possibility of a post-Pleistocene marine connection between James Bay and the Champlain Submergence in the Lake Temiskaming region. Polunin (1940) noted that the eleven plants mentioned in support of this theory are more widely distributed in the north than had been thought and may have entered James Bay by the present sea connection through Hudson Strait. More recently, LaRocque (1949) suggested a marine connection via Lake St. John as more probable than the Lake Temiskaming route.

James Bay long remained relatively unexplored botanically. From J. M. Macoun's explorations in the 1880's to the year 1949, however, there are records of nineteen collections differing greatly in size and importance. Most of these collections are represented in the National Herbarium of Canada by a complete set. Good duplicate sets have been deposited by Dutilly, O'Neill, Duman, and Lepage. Only a few specimens of Gardner's collections are present, and Potter's collection is entirely unrepresented.

1885–J. M. Macoun, from Rupert House and Rupert R.; including Lake Mistassini collections, making a list of 306 species (1885).

1887–J. M. Macoun, from shores and islands of James Bay (207) and including Rupert R. (296) and Moose R. (346), to make a list totalling 509 different species (1889).

1892–A. H. D. Ross, Eastmain R.

1896–W. Spreadborough, Moose Factory and nearby James Bay.

1899–A. P. Low, Fort George and east coast.

1901–D. B. Dowling, mouth of the Ekwan R. and Albany R., 41 species listed by John Macoun (1905).

1902–W. J. Wilson, from Moose R. to Kapiskau R. (48) and valley of Kapiskau R. (77) for a total of 111 different species listed by John Macoun (1906).

1920–Frits Johansen, Moose Factory, South Twin I., and northeastward into Hudson Bay, 165 species.

1929–A. E. Porsild, a total of 543 numbers from South Twin I. (71), Charlton I. (332), Akimiski I. (67), Fort George (14), Moose Factory (54), Albany R. (5).

1929–David Potter, south end of James Bay (1934). His published list gives 340 species and major varieties.

1932–G. Gardner, Moose R. estuary (1946).

1939–Dutilly, O'Neill, and Duman, Fort George.

1943-6–Rev. Arthème Dutilly and Rev. Ernest Lepage from many points in James Bay (1945-47).

1944–R. H. Smith, west coast of James Bay.

1947–D. F. Coates, Bear I.

1947–Baldwin, Hustich, Kucyniak, and Tuomikoski, east coast of James Bay and Hudson Bay (1949), a collection of 1,177 numbers. These, taken together with 114 specimens collected by Hustich and Tuomikoski on the Moose R., represent 499 species and major varieties.

1948–W. Y. Watson, Cape Henrietta Maria.

1949–W. K. W. Baldwin, Moose R. estuary, islands in James Bay and northward (1951). The present paper cites 113 numbers from the two James Bay islands out of a total of 650 numbers collected on the whole trip.

1950–Rev. Ernest Lepage, James Bay.

In 1949 the writer visited two small islands in James Bay while en route from Moosonee to Foxe Basin on the C.G.M.V. *Nauja* (1950). The islands are representative of two strikingly different habitats, Gasket Shoal being low and sandy, Solomon's Temple being high and rocky. The position of the two islands is shown in the accompanying sketch map of James Bay. It is the purpose of this paper to give a catalogue of the plants from these two small island habitats.

GASKET SHOAL

Gasket Shoal has an isolated position nearly 30 miles southwest of the southern point of Akimiski Island. Its position has remained doubtful until fixed by the Geodetic Survey of Canada upon the observations of Mr. D. B. Coombs from our camp-site, at latitude 52° 25′ 19·2″ N. and longitude 80° 14′ 57·2″ W. It is a small, low, sandy island, triangular in shape. The northeastern corner is nearly a right angle; the north to south side is 730 yards and the east to west side 430 yards long.

According to the British Admiralty's Arctic Pilot (1947), Gasket Shoal extends about six miles northeastward from the island, the height of which is about 20 feet. Captain W. Coats (Barrow, 1852) describes the island as "a dry bank a quarter of a mile long, but the reefs from it may be two mile" (p. 52). In another place (p. 47) Coats writes " 'Tis about two mile long, S.S.W. and N.N.E., and drys half a mile." He saw it in the period 1727 to 1751 when he was in the service of the Hudson's Bay Company as Commander of one or other of their ships. In 1949 the island appeared to be gaining ground on the north side and losing it on the south. Driftwood is found all over the island and strand lines show well in the

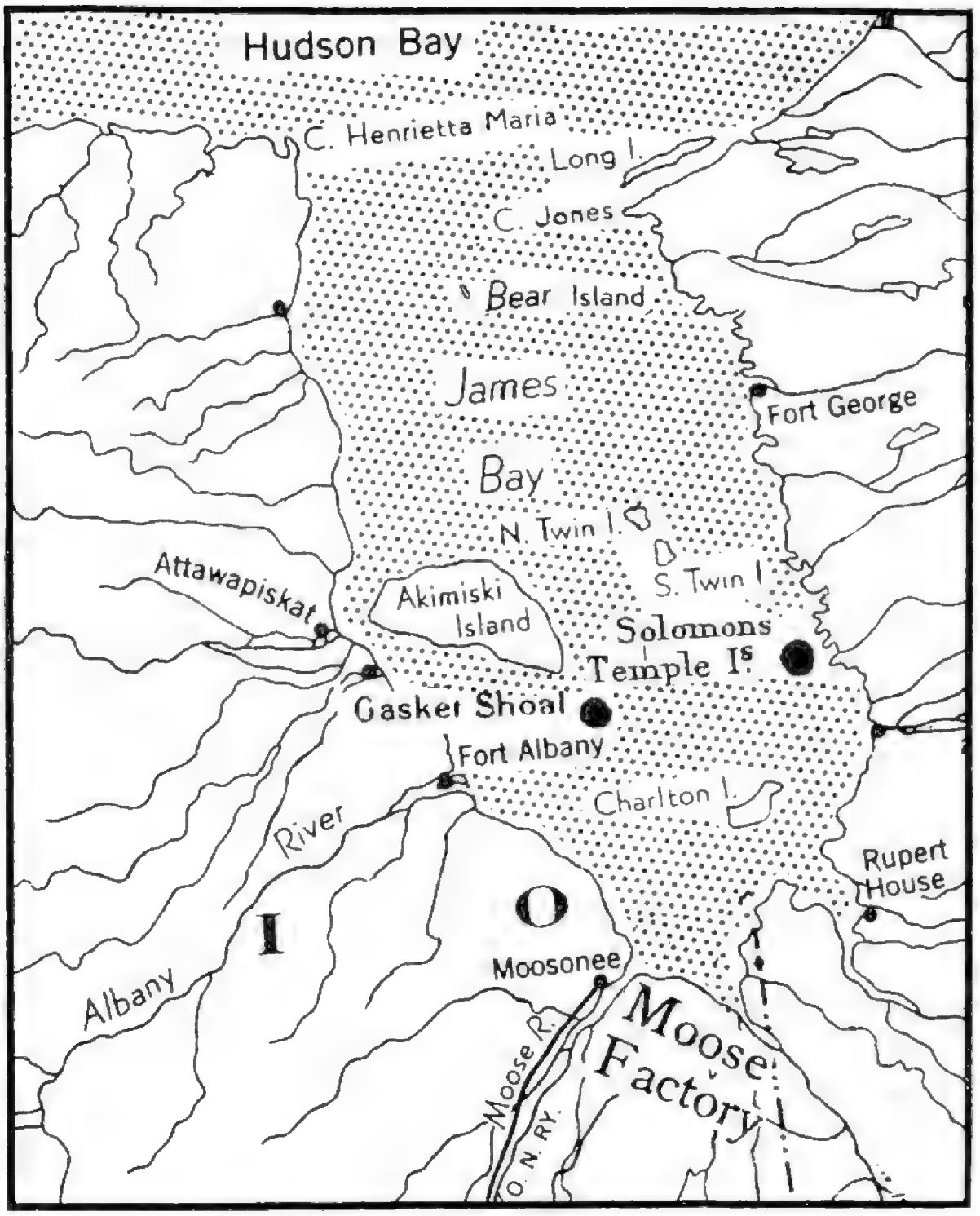


Figure 10. Sketch map of James Bay. Large dots show position of Gasket Shoal and Solomon's Temple Islands.

photograph of present shore (Plate XXXIV). Manning (1951) believes that "the higher driftwood strand lines of James Bay can only be accounted for by a fall of the sea-level of at least 10 feet since their formation." Evidently Gasket Shoal and its vegetation have remained relatively stable for the past 200 years, the long term trend having been land emergence since the Pleistocene marine submergence of the Hudson Bay lowlands.

PLATE XXXIV

Shoreline of Gasket Shoal.

The sandy shoreline is marked by the usual windrow of kelp washed upon the shore which shows as a dark strand line in Plate XXXIV. Mats of *Arenaria peploides* formed the only vegetation up to the level of a strand line of driftwood. Here began the zone of *Elymus arenarius* var. *villosus* and *Lathyrus japonicus* which is so characteristic of the sandy beaches of this region. At the seaward edge of this zone was found a nesting colony of gulls. The *Elymus-Lathyrus* zone faded out inland to a luxuriant patch of two Draba species (*Draba aurea* and *D. arabisans*), in which nested a large colony of eider ducks. Elements of the beach vegetation persisted inland over the low interior of sand and gravel where a nesting colony of terns was found. On the sides of low gravel ridges there were a few scattered bushes of willows (*Salix glaucophylloides, S. cordifolia* var. ? *typica,* and *S.* ? *glauca*) and *Juniperus communis* var. *depressa,* all about 3 feet high. A few tangled clumps of *Shepherdia canadensis* were also found.

The following 35 species and major varieties were noted on Gasket Shoal. They were collected on July 9th and 10th, 1949, when such plants as fireweed (*Epilobium angustifolium*) were still immature. Other immature plants were possibly missed, but the collection is believed to be representative of this small isolated sandy island habitat.

PLATE XXXV

Willow (*Salix ? glauca*) on low gravel ridge in centre of Gasket Shoal.

Botrychium Lunaria (L.) Sw.
Inland, at foot of low gravel ridge, in mosses where locally abundant, No. 1585.

Juniperus communis L. var. **depressa** Pursh
A few clumps on higher gravelly areas in centre of island, No. 1593.

Poa arctica R. Br.
Gravelly area in centre of island, No. 1594.

Festuca brachyphylla Schultes
Sandy places above shore, No. 1582.

Elymus arenarius L. var. **villosus** Mey.
Abundant, forming a wide zone above the sandy shoreline and extending inland in scattered patches and individuals. Nests of gulls and eider ducks in the shoreline zone, No. 1614.

Carex brunnescens (Pers.) Poir.
Only one colony on wet sandy gravel near centre of island, No. 1613.

Juncus balticus Willd. var. **littoralis** Engelm.
Above sandy shoreline, No. 1607.

Salix ? glauca L.
Shrub, low (2 feet) and spreading (6 feet) on south side of low gravel ridge in centre of island—only two colonies, No. 1591.

Salix cordifolia Pursh ? var. **typica** Fern.
Growing close to *S. ? glauca* with the same habit and frequency, No. 1589.

S. glaucophylloides Fern.
An isolated tangle of shrubs, 3 feet high, on the south side of a low gravel bank, No. 1603.

Stellaria vestita Greene
Above sandy shoreline, Nos. 1584 and 1612.

Arenaria lateriflora L.
Wet sandy depressions above shoreline, No. 1611.

A. peploides L.
Extending inland from sandy shoreline where it forms isolated mats in advance of *Elymus arenaria* zone, very common, No. 1583.

Ranunculus pedatifidus Sm.
Common on moss covered sandy areas above beach and inland, No. 1588.

Anemone multifida Poir.
Common on sandy gravel areas in the centre of the island, No. 1598.

Draba aurea M. Vahl.
Locally abundant and dominating the vegetation surrounding the nesting colony of eider ducks, approaching *D. minganensis* (Victorin) Fern., No. 1581.

D. arabisans Michx.
Common over whole island, No. 1615; and abundant around nesting colony of eider ducks, No. 1579.

Draba arabisans Michx. X ?
Common in the centre of the island on sand and gravel, Nos. 1586 and 1600.

Arabis arenicola (Richards.) Gel.
In wet depressions on sand and gravel, No. 1587.

Saxifraga tricuspidata Rottb.
Common and widespread over centre of island, No. 1604.

Ribes oxyacanthoides L.
One large colony on southern slope of low gravel ridge at centre of island, No. 1595.

Fragaria virginiana Duchesne var. **terra-novae** (Rydb.) Fern. & Wieg.
Common on sandy bank above shore, No. 1599.

Potentilla pulchella R. Br.
On sandy interior of island and around nesting colony of eider ducks, No. 1590.

P. multifida L.
On low sand and gravel ridges particularly around nesting colony of terns, No. 1601.

P. Egedii Wormsk. var. **groenlandica** (Tratt.) Polunin
Common along sandy shoreline and in wet depressions behind beach, No. 1608.

Lathyrus aponicus Willd. var. **aleuticus** (Green) Fern.
Forming a characteristic zone above shoreline with *Elymus arenarius* and extending inland on wet sandy areas, very common and luxuriant, No. 1580.

Empetrum nigrum L. var. **hermaphroditum** (Lange) Sorensen
Infrequent, found only on south side of a low gravel bank, No. 1602.

Shepherdia canadensis (L.) Nutt.
A few clumps on side of low gravel ridges, No. 1592.

Epilobium angustifolium L.
Immature plants were noted as common on sandy gravel near centre of island.

Androsace septentrionalis L.
In wet sandy depressions in centre of island, No. 1597.

Lomatogonium rotatum (L.) Fries
Immature plants from wet sandy area behind shoreline, No. 1610.

Campanula rotundifolia L. var. **arctica** Lange
On sand in the centre of the island, No. 1609.

Achillea nigrescens (E. Mey.) Rydb.
On sand over most of the island, No. 1596.

Artemisia borealis Pall.
Sand and low gravelly banks, No. 1606.

A. diversifolia Rydb.
On sand behind shoreline, No. 1605.

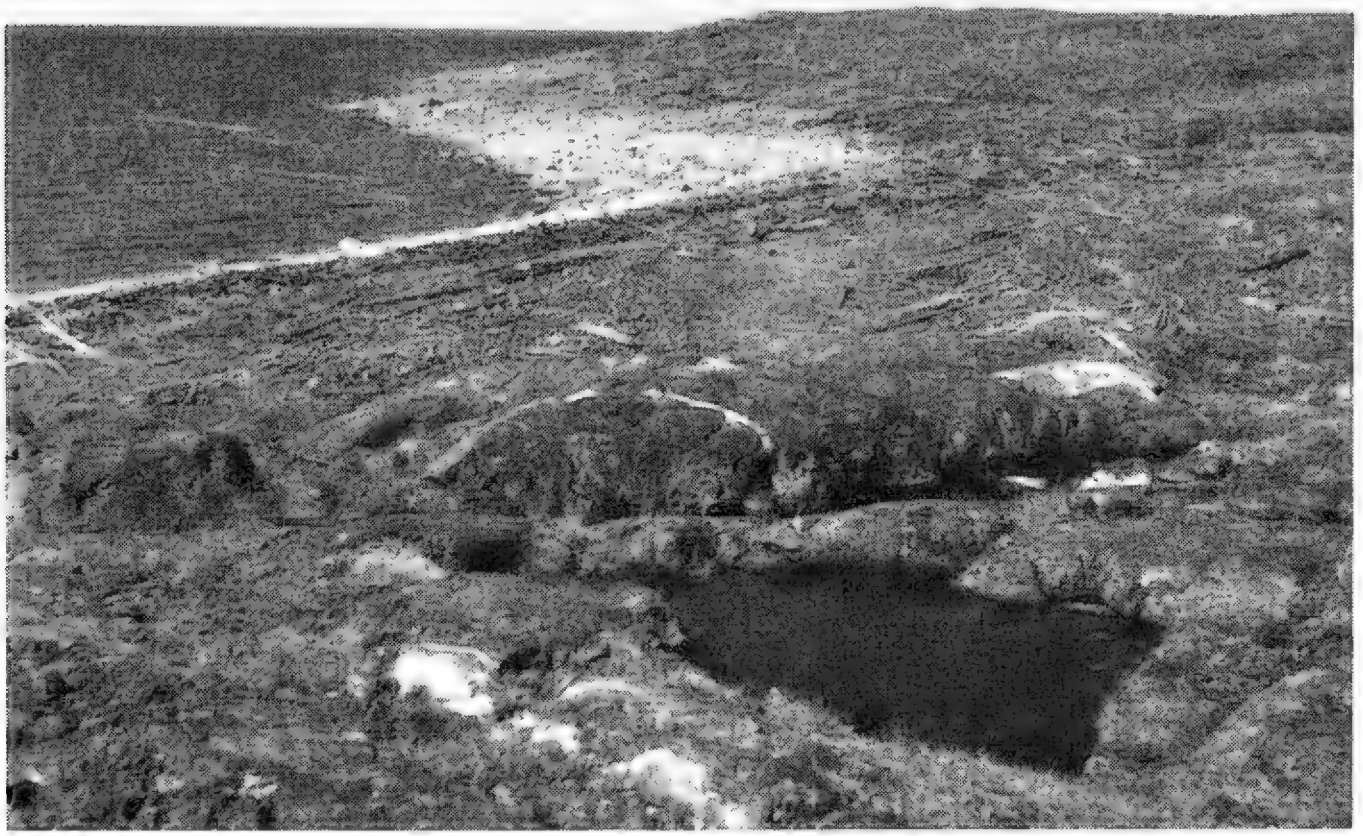
SOLOMON'S TEMPLE

The name "Solomon's Temple" has been applied to at least two different islands on the east side of James Bay, as was pointed out by Low (1889). The position of our camp-site has been fixed at latitude 52° 49′ 11·3″ N. and longitude 79° 08′ 58·7″ W., on a high rocky island, roughly 12 miles off the east coast, outside Moar Bay. Collections were made from the largest of the group of small rocky islands. This island is irregularly shaped, like a piece from a jigsaw puzzle. The east to west dimension is 2,600 yards, and the north to south width is 1,900 yards. Our island is composed chiefly of andesitic or basaltic pillow lavas. Low's

geological map (1900) shows a strip of similar rocks continued through another group, the Paint Hills Islands, to the mainland at the Makatua River. There is, indeed, a close resemblance in vegetation as well as rock substrate to the island in the Paint Hills group that the writer (1949) visited in 1947 (Hustich, 1949 and 1950). Only the Cape Hope Islands, about 30 miles to the southwest, are marked similarly on Low's map. In contrast, the rocks of the mainland of the east coast of James Bay are chiefly granite and gneiss, with many low islands along the coast entirely covered with sand and gravel.

The shoreline of Solomon's Temple Island is mostly rocky and barren with an extensive boulder beach on the north side. There is no *Elymus-Lathyrus* zone. Above the shoreline is a series of older strand lines marked by driftwood. Here, and in the rocky crevices close to the coast, *Primula stricta* was locally abundant. Above the strand lines rise bare rocky hills on which occur small shallow pools. In two separate pools vigorous colonies of *Menyanthes trifoliata* and *Hippuris vulgaris* were found. The margins of pools provided a habitat for several northern sedges. In wet ground around pools was found the habitat richest in number of species for the island. Between the barren rocky areas the chief component of the vege-

PLATE XXXVI



North coast of Solomon's Temple Island showing rocky terrain and strand lines of driftwood.

tation was *Empetrum nigrum* var. *hermaphroditum*, which was abundant everywhere. The higher slopes were covered with *Vaccinium uliginosum* var. *alpinum* and *V. uliginosum* forma *pubescens*. Here one willow (*Salix*

cordifolia var. *callicarpaea*) formed a dense low scrub over wide areas. On the gravel slopes *Dryas integrifolia* predominated with patches of *Salix reticulata* growing close on the edges of the rockier places.

A few isolated clumps of dwarfed spruce occurred along the south coast and above sheltered pools. The black spruce (*Picea mariana*) was the more stunted. White spruce (*P. glauca*) reached a height of 5 feet in two bushy patches about 15 feet wide.

PLATE XXXVII

Pool on rocky hillside of Solomon's Temple Island; dwarfed black spruce on far side.

Sixty-seven species and major varieties were noted on the island. Some plants were immature on July 14th to 17th, and a few may have been overlooked for this reason.

Equisetum arvense L.
Inland slopes below dwarf willows, No. 1687.

Lycopodium Selago L.
Rocky slopes and heaths, No. 1671.

Picea glauca (Moench) Voss
South coast, a few dwarf clumps with stems up to 5 feet high, No. 1674.

Picea mariana (Mill.) BSP.
Very dwarfed shrubs less than 2 feet high near sheltered pool, only a few clumps, No. 1667.

Hierochloe odorata (L.) Beauv.
Around pool near shore, infrequent, No. 1696.

Agrostis borealis Hartm.
Gravelly area around pool on rocky hilltop, No. 1712.

Festuca brachyphylla Schultes
On one of the few sandy places on the coast, No. 1682.

Scirpus caespitosus L. ssp. **austriacus** (Palla) Asch. & Graebn.
Abundant on margins of pools, No. 1655.

Eriophorum angustifolium Honckeny var. **majus** Schultz
Margin of pool in low-lying area between hills, No. 1664.

Carex nardina Fries var. **atriceps** Kük.
Around rocky pool near hilltop, No. 1699.

C. arctogena H. Smith
Gravelly area around pool on rocky hilltop, No. 1713.

C. maritima Gunn.
Around pools on rocky hill above coast, No. 1697.

C. glareosa Wahlenb. var. **amphigena** Fern.
In sand above rocky shoreline, No. 1679.

C. scirpoidea Michx.
Widespread and common chiefly on gentle inland slopes and around rocky pools, Nos. 1657, 1657A, 1691, and 1693.

C. glacialis Mack.
Around rocky pool near hilltop, No. 1700.

C. bicolor All.
In rock chips around pool near hilltop, No. 1702.

C. capillaris L.
Around rocky pool near hilltop, No. 1698.

C. rariflora (Wahlenb.) Sm.
At rocky seacoast, No. 1646; and more commonly in depressions in the rocky interior of the island, No. 1707.

C. norvegica Retz.
Margin of pool on rocky hill above north coast, No. 1703.

C. concolor R. Br.
In rock chips around pool near hilltop, No. 1701.

C. Bigelowii Torrey
Around drying pools between hills in centre of island, No. 1689.

C. saxatilis L.
Common around drying pools, Nos. 1663, 1705, and 1708.

Juncus balticus Willd. var. **littoralis** Engelm.
Around drying pools, between hills in centre of island, No. 1692.

J. albescens (Lange) Fern.
In mud and rock chips around pool near hilltop, No. 1704.

Tofieldia palustris Huds.
Banks of watercourse at coast, No. 1643.

Habenaria hyperborea (L.) R. Br.
Banks of watercourse approaching coast, No. 1647.

Habenaria obtusata (L.) R. Br.
With *Habenaria hyperborea* on damp banks, No. 1648.

Salix reticulata L.
Abundant on gentle slopes all over the island, Nos. 1650 and 1651.

S. arctophila Cock.
Rocky upland, No. 1656.

S. cordifolia Pursh var. **callicarpaea** (Trautv.) Fern.
Very common and widespread over interior of island where it formed extensive mats, Nos. 1652, 1670, 1684, 1686, 1688, and 1715.

Polygonum viviparum L.
Around drying pools between hills in centre of island, No. 1690.

Stellaria vestita Greene
On patch of sand near coast, No. 1681.

Cerastium alpinum L.
Widespread in small scattered colonies over the whole island, No. 1710.

Arenaria groenlandica (Retz.) Spreng.
Infrequent and only in rock crevices on hilltops above the north coast, No. 1661.

Silene acaulis L. var. **exscapa** (All.) DC.
Common in rock crevices and on hills along coast, No. 1662.

Saxifraga caespitosa L.
In rock crevices on hilltops and barren areas all over the island, No. 1673.

S. tricuspidata Rottb.
Common on gravelly slopes close to rocky hillsides, No. 1672.

S. oppositifolia L.
In rock crevices and barren gravelly areas near hilltops, No. 1711.

Rubus Chamaemorus L.
Around pools in low lying areas in the hills, No. 1668.

Potentilla tridentata Ait.
From small island of drift off south coast of Solomon's Temple Island, No. 1717.

P. Egedii Wormsk. var. **groenlandica** (Tratt.) Polunin
On sand between boulders on coast, No. 1678.

Dryas integrifolia M. Vahl
Common and luxuriant on gentle gravel slopes between hills, No. 1658.

Lathyrus japonicus Willd. var. **aleuticus** (Greene) Fern.
On the few sandy areas between boulders at the coastline, No. 1675.

Empetrum nigrum L. var. **hermaphroditum** (Lange) Sörensen.
The chief plant covering the slopes of the hills between the barren rocks, No. 1706.

Shepherdia canadensis (L.) Nutt.

Common on gravelly banks between hills, No. 1659.

Epilobium angustifolium L.

Immature plants seen but not collected, particularly common on sand between boulders and strand lines of driftwood.

Epilobium latifolium L.

On sand between boulders along coast, No. 1676.

Hippuris vulgaris L.

Luxuriant colonies in rocky pools about one foot deep with muddy bottoms, No. 1695.

Ligusticum scothicum L.

Immature plants seen but not collected, on sand between boulders at coastline.

Pyrola grandiflora Radius

Common on gentle slopes, particularly on banks of watercourse, No. 1644.

Ledum groenlandicum Oed.

In low lying areas between hills and above south coast, No. 1685.

Rhododendron lapponicum (L.) Wahlenb.

On rocky hillsides and exposed gravelly areas where common, No. 1666.

Loiseleuria procumbens (L.) Desv.

Common on gentle slopes between rocky hills, No. 1653.

Andromeda Polifolia L.

In low lying areas between rocky hills and on south coast, No. 1683.

Arctostaphylos rubra (Rehder & Wilson) Fern.

Abundant and covering large areas of gentle slopes on flanks of rocky hills, No. 1645.

Vaccinium uliginosum L. forma **pubescens** (Lange) Polunin

A major constituent of the plant cover of the whole island, No. 1649.

Vaccinium uliginosum L. var. **alpinum** Big.

Common in rocky crevices and near tops of hills, No. 1669.

V. Vitis-Idaea L. var. **minus** Lodd.

Common on gravel with *Dryas integrifolia* and *Shepherdia canadensis*, No. 1660.

Oxycoccus sp.

A few sterile scraps picked up with *Ledum groenlandicum*.

Primula stricta Hornem.

Locally abundant along coastal strand lines of driftwood, No. 1654.

Menyanthes trifoliata L.

In rocky pool one foot deep, with muddy bottom, No. 1665.

64201—12½

Bartsia alpina L.

From small island of drift off south coast, No. 1716.

Pedicularis flammea L.

In low lying areas and gravelly slopes between hills, No. 1709.

P. labradorica Wirsing

In low lying areas between hills, No. 1694.

Pinguicula vulgaris L.

Locally abundant on margins of shallow pools and wet rock crevices near coast, No. 1642.

Plantago juncoides Lam. var. **decipiens** (Barneoud) Fern.

On scattered sandy patches between boulders at coast, No. 1677.

Chrysanthemum arcticum L.

On sand between boulders at coast, No. 1680.

Only 8 species are common to Gasket Shoal and Solomon's Temple. These are common plants of sandy shores in this region as follows:

Festuca brachyphylla
Juncus balticus var. *littoralis*
Stellaria vestita
Saxifraga tricuspidata
Potentilla Egedii var. *groenlandica*
Lathyrus japonicus var. *aleuticus*
Empetrum nigrum var. *hermaphroditum*
Shepherdia canadensis
Epilobium angustifolium

The total number of species collected from the two islands is 94. The collections amount to 113 numbers represented by 459 sheets, of which the first set is deposited in the National Herbarium of Canada.

The 94 species from these two habitats may be compared with J. M. Macoun's list (1889) of 207 from the shores and islands of James Bay. Potter (1934) lists 94 species from Charlton Island and 340 from the southern end of James Bay, including the Abitibi River and the estuary of the Moose River. Hustich (1949) gives an estimate of 400 to 450 species for the James Bay–Hudson Bay area of the Labrador Peninsula.

ACKNOWLEDGMENT

Acknowledgment is gratefully made to the fellow members of the 1949 Foxe Basin Expedition and to Mr. A. E. Porsild, Chief Botanist of the National Museum of Canada, for his help in checking determinations of these collections and in preparing this paper.

REFERENCES

Arctic Pilot, vol. III. Hydrographic Dept., Admiralty, fourth edition, London. 1947.

Baldwin, W. K. W. Botanical investigations on the east coast of Hudson and James Bay. Nat. Mus., Canada, Bull. 113, pp. 31-32. 1949.

———Biological investigations on the 1949 Foxe Basin Expedition. Nat. Mus., Canada, Bull. 123, pp. 162-165. 1951.

Barrow, J. The geography of the Hudson Bay, being the remarks of Captain W. Coats. The Hakluyt Society, London. 1852.

Dutilly, le père Arthème, et l'abbe Ernest Lepage. Coup d'œil sur la flore subarctique du Québec, de la baie James au lac Mistassini. Le Naturaliste canadien, 72 : 185-225, 226-288; 73 : 419-436; 74 : 43-60, 66-79, 177-189, 207-224, 250-273. 1945-47.

Gardner, G. Liste des plantes récoltées sur la cote du Labrador et régions limitrophes. Bull. Soc. Bot. France, 93 : 1-38. 1946.

Hustich, I. On the forest geography of the Labrador peninsula. Acta Geographica, 10 : 1-63. 1949.

———Notes on the forests on the East Coast of Hudson Bay and James Bay. Acta Geographica 11 : 3-83. 1950.

LaRocque, A. Post-pleistocene connection between James Bay and the Gulf of Saint Lawrence. Bull. Geol. Soc. Amer. 60 : 363-380. 1949.

Low, A. P. Report on explorations in James Bay, and country east of Hudson Bay, drained by the Big, Great Whale and Clearwater Rivers, 1887 and 1888. Ann. Rept., Geol. Surv., Canada, 3 : 5-62J. 1889.

———Report on an exploration of the east coast of Hudson Bay from Cape Wolstenholme to the south end of James Bay. Ann. Rept., Geol. Surv., Canada, 13 : 5-84D. 1900.

Macoun, James M. List of plants collected at Lake Mistassini, Rupert River, and Rupert House, 1885. Ann. Rept., Geol. Surv., Canada, 1 : 36-44D. 1885.

———Notes on the flora of James Bay. Bot. Gaz., 13 : 115-118. 1888.

———List of plants collected on the Rupert and Moose Rivers, along the shores of James Bay, and on the islands in James Bay during the summers of 1885 and 1887. Ann. Rept., Geol. Surv., Canada, 3 : 63-74J. 1889.

Macoun, John. List of plants collected by D. B. Dowling at the mouth of the Ekwan and Albany Rivers, 1901 (misprinted as 1891). Ann. Rept., Geol. Surv., Canada, 14 : 60F. 1905.

———List of plants collected by W. J. Wilson along the shores of James Bay and in the valley of Kapiscau River. Ann. Rept., Geol. Surv., Canada, 15 : 241-243A. 1906.

Manning, T. H. Remarks on the tides and driftwood strand lines along the east coast of James Bay. Arctic, 4 : 122-130. 1951.

Polunin, N. Botany of the Canadian Eastern Arctic, Pt. 1. Nat. Mus., Canada, Bull. 92, pp. 1-408. 1940.

Potter, D. Botanical evidence of a post-pleistocene marine connection between Hudson Bay and the St. Lawrence Basin. Rhodora, 34 : 69-89, 101-112. 1932.

———Plants collected in the southern region of James Bay. Rhodora, 36 : 274-284. 1934.

MAMMALS OF THE TROIS PISTOLES AREA AND THE GASPE PENINSULA, QUEBEC

By A. W. Cameron

While engaged in a study of the harbour and grey seals of the lower St. Lawrence River area in the summer of 1951, the writer and his assistant, Marshall H. Ronalds, had an opportunity to make a small collection of terrestrial mammals. Specimens were secured at two localities: Trois Pistoles, on the south shore of the St. Lawrence River, and Cortereal, near the tip of the Gaspé Peninsula. The present paper is a report on the results of this expedition. Fortunately, the National Museum has a good series of mammals from the Gaspé Peninsula which, in addition to material collected in 1951, made it possible to determine the taxonomic status of most of the species involved, as well as to establish with certainty the distribution of several races heretofore poorly understood.

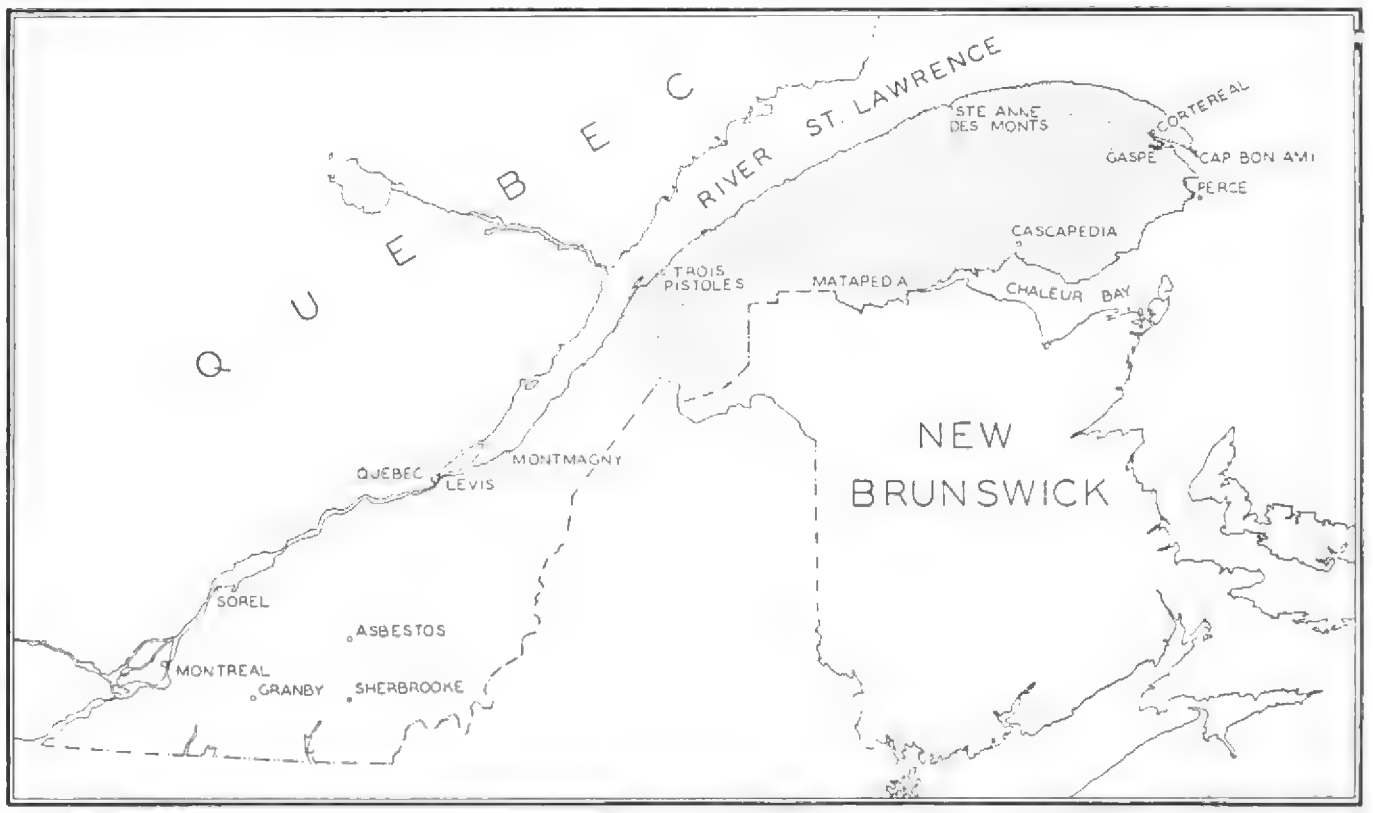


Figure 11. Sketch map showing Trois Pistoles area and Gaspé Peninsula.

The areas worked during the summer were chosen because of the existence of seal colonies of sufficient size to warrant special study. In the Trois Pistoles area a colony of grey seals is located on a group of low, rocky islands in the St. Lawrence River known as the Razades. These islands form a part of a bird sanctuary, where the seals are unmolested and where they may be studied with a minimum of difficulty. A three-week period, from May 21 to June 12 was spent in this area. Through the kindness of Dr. D. A. Déry, of the Provancher Society of Natural History, we were able to arrange for several visits to the colony and to other points of zoological interest. The period from July 19 to August 1 was spent in Gaspé Peninsula, studying a colony located at Cap Bon Ami near Cape Gaspé.

In addition to our stay at Trois Pistoles and Cap Bon Ami, we spent a month (June 20 to July 18) on the Dartmouth River, about ten miles from the village of Cortereal. This area is quite heavily wooded, and there was a sufficient diversity of habitats to enable us to collect good series of mammals especially desired for taxonomic purposes.

The latter part of the summer was spent at a whaling factory at Dildo, on the east coast of Newfoundland. Here our studies were concerned primarily with cetaceans.

DESCRIPTION OF AREA

The region is part of the Appalachian Highlands, or Appalachian Mountain system, which stretches from Alabama northeast to Newfoundland. In central Gaspé the mountains are known as the Shickshock Range, an upland composed of flat-topped summits, of which the highest is Mount Jacques Cartier on Tabletop Mountain, elevation 4,160 feet. Across the St. Anne River to the west, another mountain, Mount Albert, has for a length of $3\frac{1}{2}$ miles and a width of $1\frac{1}{2}$ miles a summit about 3,750 feet high almost as flat as the western prairies. Both to the north and to the south of the Shickshocks is lower upland country showing a very uniform skyline and with areas between the river valleys remarkably flat-topped. The valleys entrenched beneath this upland surface are steep-sided, and the streams occupying them are swift. Immediately bordering the St. Lawrence, as far east as Ste. Anne des Monts, the country is rolling, and agriculture is carried out. A few miles farther northeast, however, the upland country comes out to the river, breaking off in abrupt cliffs.

The north side of the Peninsula has a remarkably smooth outline following the strike of the rock formations. The Chaleur Bay side of the Peninsula is more irregular with, in places, a broader lowland belt devoted to agriculture. Back of the settled belt the whole region is uninhabited, but a certain amount of lumbering, fishing, hunting, and prospecting is carried out.

According to Halliday (1937) the forest cover in the Trois Pistoles area and on the lowlands of the Gaspé Peninsula is characterized by the presence of large stands of white cedar (*Thuja occidentalis*) and the almost complete absence of red spruce (*Picea rubens*). White spruce (*Picea glauca*) and balsam fir (*Abies balsamea*) are common and may occur either in pure stands or mixed with yellow birch (*Betula lutea*), white birch (*Betula papyrifera*), and wire birch (*Betula populifolia*). On higher and drier situations, sugar maple (*Acer saccharum*) and yellow birch predominate. On the river flats, balsam poplar (*Populus balsamifera*) and white elm (*Ulmus americana*) are conspicuous.

On the higher hills of the Gaspé Peninsula, black spruce (*Picea mariana*) and white spruce predominate, with white birch scattered throughout. In the river valleys, white cedar, black ash (*Fraxinus nigra*), white pine (*Pinus strobus*), and sugar maple occur in small amounts.

THE MAMMALIAN FAUNA

At the present time there are only a few areas east of the St. Lawrence River that may be regarded as wilderness; the Gaspé Peninsula is one of these. Although there have been settlements along the coast for over three centuries, the interior remains much the same as it was when the white man first came to the region. This is reflected in the mammal life of the peninsula. Over the greater part of southeastern Canada the woodland caribou, marten, fisher, and lynx are either rare or absent, although small populations still occur in Gaspesia. Since over ninety per cent of the land area is still forest, it is not surprising that most of the mammals are woodland species. At Cortereal, near the tip of the peninsula, where we spent a month collecting, such forest species as red squirrels, red-backed mice, and deer mice were abundant. On the other hand, such aquatic species as the beaver and muskrat are scarce, because marshes and slow-moving streams are few. The mountainous nature of the terrain is responsible for the scarcity of areas suitable for these mammals.

The south shore of the St. Lawrence River is quite densely settled, and farming is an important industry. As a result, the countryside consists of farmlands with their small woodlots separated by fields. The mammal species most abundant here are those which prefer open or semi-open country, such as woodchucks, chipmunks, white-tailed deer, and meadow mice. The sub-climax woodlands, marshes, pastures, open fields, and brushy borders provide a diversity of habitats, and mammals are, on the whole, more abundant than in the climax forests of the Gaspé Peninsula.

A number of races, alleged to be peculiar to the Gaspé Peninsula, have been described, although it is now clear that most, if not all of them, are invalid. Considering that the mammals of the peninsula are not now, nor apparently never were, separated from members of the same species in neighbouring areas, the possibility of their being distinct races in the region seems most unlikely. Isolation is a necessary prerequisite to speciation, and it is only under rather exceptional circumstances that distinct subspecies will be found to occur in an area where such conditions do not exist. When it is apparent that such conditions have existed over a long period of time, however, it is only natural for both zoologists and botanists to expect that the native fauna and flora will differ sufficiently from those of other areas to warrant their being described as new.

Geologists once believed that the mountains of the Gaspé Peninsula were not glaciated, and there seemed to be good supporting botanical evidence (Fernald, 1925) that certain plant species now found on the Peninsula were relicts. Geological studies of the highlands of the peninsula failed to reveal the characteristic striæ evident on exposed rocks where glaciation has occurred. It seemed natural to assume, therefore, that the mountain peaks were nunataks. Alcock (1935), however, proved beyond a shadow of doubt that these areas were glaciated and that the absence of striæ is due to the fact that small local glaciers formed on the peaks *before* the larger Laurentide sheet moved into the area. The exposed

rocks, therefore, were shielded from the abrasive action of the moving glacier by the previously formed ice-caps. As a result, the characteristic striæ are not present.

The botanists Wynne-Edwards (1937) and Scoggan (1950) have shown that the plants Fernald thought to be relicts occur in the region, not because they survived glaciation, but because climatic and edaphic conditions are favourable to their growth. This being the case, it is unnecessary to postulate the existence of refugia.

It was presumably on the strength of the above-mentioned theory held by the geologists and botanists that some zoologists described a number of new races from the Gaspé Peninsula. Unfortunately, the series on which these descriptions were based were very small, and it is therefore not surprising that the investigators were misled into supposing that slight individual variation was characteristic of the population as a whole.

The taxonomy of the various mammal subspecies described from the Gaspé Peninsula have been carefully examined in the present study. Of the five races described from the area, three have been proved to be untenable, and the remaining two are recognized only because there is at present insufficient material to determine their validity. Nevertheless, it will be surprising indeed, if they are found to be valid. The only exception is the Gaspé shrew, *Sorex gaspensis,* which is restricted to the higher elevations of the mountains and therefore isolated from related forms (such as *dispar*).

As might be expected, the mammals of the Gaspé Peninsula have their affinities with those of New Brunswick and other areas lying south and east of the St. Lawrence River. In a few cases (e.g. *Microtus pennsylvanicus* and *Peromyscus*) the Gaspé specimens show a slight tendency toward intergradation with the races occurring west of the St. Lawrence River. This river appears to be an effective barrier to mammalian dispersal, and in the more plastic species, specimens taken from localities directly opposite each other across the river are often quite distinct.

PREVIOUS WORK IN THE AREA

Dr. George G. Goodwin collected in the Mount Albert area of the Gaspé Peninsula during the months of August and September, 1923. Later he published a report on the results of this expedition in the Journal of Mammalogy, Vol. 5, pp. 250-257. Thirty-five species are treated in his annotated list. Much of the information is based on another collection made by Mr. Childs Frick in the Grand Cascapedia area.

Again in 1927 Dr. Goodwin collected on the Gaspé Peninsula. On this occasion he concentrated on the study of the mammals of the Grand Cascapedia area. He obtained first-hand information on twenty-five species. An account of this expedition with an annotated list was published in the Journal of Mammalogy, Vol. 10, pp. 239-246.

Dr. R. M. Anderson spent the months of August and September in 1922 and again in 1923 in the Mount Albert, Ste. Anne River, and Grand

Cascapedia River areas. While no report on these expeditions was published as such, notes on taxonomy and distribution of Gaspé mammals were included in several of his more comprehensive publications. Two of these are worthy of particular mention here: "Catalogue of Canadian Recent Mammals" (1946) and "Mammals of the Province of Quebec" (1939). The former is one of the important publications on Canadian mammals and contains a wealth of information on the mammals of the Gaspé Peninsula and their taxonomic relationships to subspecies in neighbouring areas. The latter is an excellent compilation of all the available information on the mammals recorded for the province of Quebec.

LIST OF SPECIES

Star-nosed Mole. *Condylura cristata cristata* (Linnaeus)

The National Museum of Canada has one specimen from the Grand Cascapedia River area, Bonaventure County. None was collected in 1951, although residents of the Trois Pistoles area reported that they have seen specimens of this mole.

Maritime Cinereous Shrew. *Sorex cinereus acadicus* Gilpin

This shrew was rather uncommon at Trois Pistoles. Red-backed and deer mice were abundant in the woodlands where this shrew might be expected, and it is suspected that these entered the traps before the shrews had an opportunity to do so. Two specimens were secured in a shrubby border between hayfields.

The Dartmouth River specimens were taken in mixed secondary woods near the edge of slashings. Here again red-backed and deer mice were abundant, and shrews were taken only after the other two species were trapped out. However, the high incidence of injury to trapped mice suggests that they were more abundant than trapping results would indicate. Raw strips of bacon proved the most satisfactory of all the baits tried.

Nine specimens were secured. Five adults averaged – total length: 101·2; tail: 43·3; hind foot: 12·4.

The slightly smaller size of the Quebec specimens as compared with Nova Scotia specimens of *acadicus* probably indicates intergradation with the nominate race.

Northern Smoky Shrew. *Sorex fumeus umbrosus* Jackson

Goodwin (1929) collected twelve specimens in the Cascapedia River area in the summer of 1927. The National Museum of Canada has no specimens.

Acadian Water Shrew. *Sorex palustris gloveralleni* Jackson

The National Museum has three specimens collected by R. M. Anderson in the autumn of 1922 at Ste. Anne River, Gaspé County, and one each from Cascapedia River and Berry Mountain Camp, Matane County, taken in the autumn of 1923.

Gaspe Shrew. *Sorex gaspensis* Anthony and Goodwin

Nine specimens were collected by Goodwin (1929) in the Cascapedia River area. This species is evidently restricted to elevations of over 2,000 feet in the mountains of the Gaspé Peninsula. The National Museum of Canada has no specimens.

Gaspe Short-tailed Shrew. *Blarina brevicauda angusta* Anderson

This species was not collected by the 1951 field party, although traps were set in what appeared to be suitable habitat. Ten specimens were collected by W. Grenier at Cascapedia during the summer of 1932. There are two other specimens in the National Collection collected at Kelly's Camp on the Grand Cascapedia River.

This is a very poorly defined race that will probably prove invalid upon the examination of a large series of specimens. *Blarina* is a nonplastic species, although specimens from east of the St. Lawrence River tend to be slightly paler than those from Ontario. On the basis of this, Smith (1940) described the Nova Scotia race *B. b. pallida,* although he points out that it is not a well-defined race. The existence of a distinct race on the Gaspé Peninsula seems highly improbable, and there is little in the available material from the area to indicate that it should be so regarded.

Northern Pigmy Shrew. *Microsorex hoyi intervectus* Jackson

The National Museum of Canada has specimens from the following localities: Grand Cascapedia: 3; Federal Mine, Gaspé County: 2; Ste. Anne River, Gaspé County: 3; Berry Mountain Camp, Matane County: 3; Indian Brook, Matane County: 1.

Little Brown Bat. *Myotis lucifugus lucifugus* (LeConte)

The spring and summer of 1951 was very cold and damp, and bats were observed on only one occasion at Cortereal (July 9). Local residents at both Trois Pistoles and Grande Grève reported that bats are not uncommon in midsummer.

Goodwin (1929) records this species for the Cascapedia River area. He collected nineteen specimens. The National Museum of Canada has specimens from the region.

Eastern Long-eared Bat. *Myotis keenii septentrionalis* (Trouessart)

Goodwin (1929) collected one specimen along the Cascapedia River. The National Museum of Canada has no specimens from the region.

This species is probably more abundant than specimen records would indicate. Two of seven bats collected by the writer in southwestern Newfoundland in the autumn of 1950 were this species.

Eastern Black Bear. *Euarctos americanus americanus* (Pallas)

The black bear is not uncommon in the wilderness areas of the Gaspé Peninsula, although scarce on the south shore of the St. Lawrence. Tracks were frequently observed in the Dartmouth River area, and a half-grown bear was seen on July 8. The bears congregate along the courses of the larger streams to feed on salmon when these fish are ascending the rivers to spawn. Because there is an abnormal concentration at this time of year, population estimates made at such times are likely to be misleading.

Bear hunting is a popular sport during the summer months on the Peninsula. Surveyors and woodsmen informed us that food caches are frequently broken into by bears.

Eastern Racoon. *Procyon lotor lotor* (Linnaeus)

Goodwin (1924) reports that a specimen was taken at Rivière-la-Madeleine in the autumn of 1923. Local residents at Trois Pistoles reported that racoons were unknown in that area.

Eastern Pine Marten. *Martes americanus americanus* (Turton)

Woodsmen on the Gaspé Peninsula reported that a few marten are still to be found in the wilderness areas. The season has been closed for many years.

Fisher. *Martes pennanti pennanti* (Erxleben)

Woodsmen on the Gaspé Peninsula reported that the fisher still occurs in small numbers in the wilderness interior. Goodwin (1924) reports that four skins were taken near Cap Chat during the winter of 1923-24. He had reports that the greatest concentration was located in the valley of Bonaventure River.

Richardson's Weasel. *Mustela erminea richardsoni* Bonaparte

This species is tolerably common on the Gaspé Peninsula and along the south shore of the St. Lawrence River. Dr. D. A. Déry has trapped several specimens near Trois Pistoles. There are three specimens in the National Collection from the following localities: Federal Mine, Bonaventure County; Ste. Anne, Gaspé County; Berry Mountain, Matane County. These measure: 338-91-45; 305-93-43; 315-92-43.

Eastern Mink. *Mustela vison vison* Schreber

The mink is not uncommon on the Gaspé Peninsula, although scarce on the south shore of the St. Lawrence River, where the watered areas are more restricted. Tracks were observed along a small stream 3 miles east of Trois Pistoles. Trappers on the Gaspé Peninsula secure a fairly large number of these fur-bearers each year. The numerous brooks and rivers flowing through wilderness areas provide suitable habitat for mink.

Eastern Canada Otter. *Lutra canadensis canadensis* (Schreber)

The otter occurs along the water courses on the Gaspé Peninsula. Woodsmen reported that they are most frequently observed in spring just when the ice is breaking up in the rivers. At such times they frequent the larger pools below water falls and dams. Goodwin (1924) states that four specimens were taken during the season 1923-24, two at Cap Chat and two at Ste. Anne.

Eastern Striped Skunk. *Mephitis mephitis mephitis* (Schreber)

Not uncommon in the Trois Pistoles area and on the south shore of Gaspé Peninsula. None was seen at Trois Pistoles, but farmers in the area reported that they frequently raid poultry houses and sometimes inflict serious losses. Goodwin (1924, 1929) collected one specimen at Grand Cascapedia. He reports that skunks were uncommon throughout the entire peninsula.

Northeastern Red Fox. *Vulpes fulva rubricosa* Bangs

Red foxes are abundant in the farming sections on the south shore of the St. Lawrence, less common on the Gaspé Peninsula. In many areas they are so plentiful that they constitute a serious pest to poultry raisers. Few foxes have been trapped in the last decade, and they have increased at an alarming rate throughout eastern Canada.

Because escapes from fur farms have inter-bred with the local populations of red foxes in eastern Canada, wild-caught specimens are of dubious taxonomic value.

Canada Lynx. *Lynx canadensis canadensis* Kerr

Woodsmen in the Cortereal area reported that the lynx occurs in the interior of the Gaspé Peninsula. Goodwin (1924) reports that in 1923 one was taken at Rivière-la-Madeleine and two at L'Anse Pleureuse.

Bobcat. *Lynx rufus* subsp.

Anderson (1939) reports the occurrence of a bobcat in the valley of the Cascapedia River. It is evidently rare on the Gaspé Peninsula. It is said to be not uncommon in the Eastern Townships, and there is a record of one being taken at Ste. Anne de la Pocatière (*Le Naturaliste Canadien*, vol. 58, No. 3, March, 1931), so that it probably occurs in the Trois Pistoles area.

Harbour Seal. *Phoca vitulina concolor* (DeKay)

Colonies of harbour seals are scattered along the shores of the Lower St. Lawrence and around the Gaspé Peninsula. Two of these were investigated, one at Trois Pistoles, the other near Cape Gaspé.

This species occurs commonly in the Gulf of St. Lawrence as well as on the Atlantic Coast from Maine to Labrador. Except for the grey seal, it is the only species that regularly spends the summer in this region. The two are often confused in the field, but there are a number of quite good diagnostic characters separating them, mentioned under the discussion of the grey seal.

In the Trois Pistoles area the harbour seals congregate in a small cove studded with large rocks. At high tide these rocks project above the water level, but the entire area is a mud flat when the tide is low. During the first two weeks in June about fifteen females were observed on the rocks, most of them with young. Presumably each female has a chosen rock to which she returns each day at high tide. At half tide the female with her young arrives at the rock; she draws herself out of the water and the young follows. At this time her fur is wet and the general coloration is dark, but after the fur has dried the seal appears white. When nursing, the female lies on her side and the young suckles for short periods at frequent intervals. When adjusting her position, the female bounces up and down on the top of the rock, turning slightly each time. While the two are lying on the rock, the female caresses the pup at frequent intervals. The pups seemed very small, and it is concluded that they are born in late May or early June. None showed the white natal coat so conspicuous in other seal pups. Other investigators conclude that it is lost shortly before birth.

A pup shot on June 8 was carried out by the tide and lost. Later Dr. D. A. Déry found a dead pup on the shore in the same area, the skull of which was forwarded to the Museum.

A colony of about fifty harbour seals congregated on a reef on the north shore of Cape Gaspé near Cap Bon Ami. Each day they could be observed from the top of the cliff basking on the rocks. However, the precipitous nature of the cliffs made it impossible to reach the spot without the aid of a boat. Accordingly, a boat was hired on July 23, 25, and 28. One specimen, an immature, was collected on July 23 and a pup and an adult on July 28. Several animals shot in deep water were lost. Only the pup floated after being shot.

The pup is a plain bluish grey above, silvery white below. The immature is medium grey with heavy dorsal spotting, while the adult is iron grey with faint dorsal spotting. The lemon yellow or rusty coloration of the ventral surface and sides, mentioned by some writers, was not observed in the slightest degree on any specimens taken here or elsewhere. Nevertheless, museum skins, no matter how carefully skinned and degreased, show a yellowish tinge on the grey areas of the skin. It would appear that this colour is adventitious and is rarely, if ever, found in the living animal.

Skinning and preparing a seal skin for taxonomic purposes is a difficult and often disappointing undertaking. In the case of a large specimen, a full day's work is required to prepare the skin properly. We have tried a number of methods and still do not feel that we have perfected a technique. However, the following information may be of interest to collectors.

During the skinning operation at least 1½ inches of fat should be left on skin. If the fat is almost entirely removed from the skin during the initial operation, the thin layer of fat remaining forms a tough, parchment-like film that is almost impossible to remove. After the skin with its layer of fat is removed from the carcass, it should be spread over a flat surface and the fat peeled off in large chunks. After all the fat has been removed, the skin should be stretched over a framework to dry. It should not be exposed to the sun, as the adhering flesh will blister and ruin the skin. Then a strong solution of brine is applied with a cloth. This should be repeated until the skin is perfectly dry. Steel wool is helpful when removing fat from folds in the skin around the flippers and snout.

Grey Seal. *Halichoerus grypus* (Fabricus)

The grey seal is a rather rare species and occurs at only a few restricted localities on the Atlantic Coast of Canada. It is only within the last few years that Canadian mammalogists have undertaken the study of marine mammals, so it is not surprising that the species was formerly believed to be almost extinct. Recent investigations have revealed the presence of colonies near Grand Manan Island and Mirimachi Bay, N.B., Sable Island, and Cape Breton Island, N.S., and the Magdalen Islands, Que. The remarks contained in this report are the result of a three-week study of a colony on the Razades Islands near Trois Pistoles, Que.

The identification of seals in the field is often very difficult, and since very little has been written on the subject, it is considered desirable to treat it in some detail. The grey and harbour seals are the only species that ordinarily occur in the Gulf of St. Lawrence and southward during the summer months. Therefore, these two species are the ones most likely to be confused.

The grey seal is a large species, males sometimes reaching a total length of 9½ feet, although 8 is average, while females average about 6 feet. Males vary a good deal in colour. Four general types are recognized: (1) black throughout, (2) light grey throughout, (3) medium grey with black blotches on the back, (4) light grey with black spots on the back. On the throat there are several black rings noticeable only at very close range. The females are of two colour types: (1) light grey above and white below with black spots on the back, and (2) dark grey with many black spots and blotches on the back.

Compared with the harbour seal, with which it is most likely to be confused, the grey seal appears larger and has a longer neck and a Roman nose. Seen at a distance swimming in the water, the head of the grey seal appears long, reminding one of a greyhound. In both sexes the nape is a very pale grey, and this is often apparent at quite some distance. Even when the fur is wet, the head appears greyish, except in the very dark phased animals. The head of the harbour seal appears round, and the square-cut snout is not conspicuous. When the fur is wet, the head of the harbour seal appears jet black. When the seals rear themselves out of the water, the difference in the length of the neck is apparent.

At Trois Pistoles, the grey seals congregate on the two Razades Islands. Most of them have arrived by June 2, although the earliest arrivals often reach the islands by May 24. This seal prefers rocky reefs where there is a continual pounding of the surf. For that reason they frequent the lower end of the Lower Razades during northerly winds and the Upper Razades with southerly winds. During the greater part of the day they lie on exposed, sun-warmed rocks, lolling about and bellowing from time to time. The call resembles a long, sustained bark, which may be heard for miles. There is no evidence of fighting during the summer, so the bellowing presumably serves to express some other emotion.

On May 25, in company with Dr. D. A. Déry and Mr. Marshall H. Ronalds, the writer visited the Lower Razades. The day was very calm, and we were able to make the trip in a 17-foot, oar-propelled skiff. Had it been necessary to use a motor boat, the seals would have been forewarned of our approach and it would have been impossible to make the close observations that this opportunity afforded. The following is an excerpt from my notebook written at the time:

> "As we approached the island, we could hear the seals bellowing. On drawing close we kept to the east side as we knew that the seals were lying in a rocky draw that splits the island in two. We drew the skiff up to a rocky prominence and crawled up on the rock where we were able to peer over the top to the spot where the seals were

basking. We were then only about 50 feet from them, and our first impression was one of awe at the immense size of the creatures. Many of them appeared as large as a full grown ox. Most of them were lying on their sides with one flipper in the air. One large male which we could see clearly was a very pale grey. At intervals, he would shift his position, lowering his head on the rock to sleep for a few seconds, then raising it again to peer in all directions and sniff the air. He also scratched his nose at intervals with his fore flipper. Besides the pale grey animal, there were others that ranged all the way from light grey spotted with black, through grey blotched with black to almost jet black. Most of the smaller animals, probably females, were medium grey plentifully spotted with black. From time to time seals dived into the water while others drew themselves up on the rocks to dry. When they first emerged from the water, they appeared very dark, almost black, but as they dried, the fur assumed a very pale grey colour, which looked almost white at a distance.

"Although they bellowed a great deal, there was no evidence of fighting. Their eyes, apparently, are not well adapted for above-water vision, as they seemed unable to see us, despite the fact that we were in plain sight and less than 50 feet away. While the adults were basking on the rocks, immature animals were swimming around the rocks, often rearing themselves up out of the water to have a better look at us."

The scats of this seal closely resemble those of a black bear. They feed largely on herring, sculpins, and shell fish, according to Dr. Déry, who has been studying their habits for a number of years.

The Razades are a part of a bird sanctuary so that it was not possible to collect specimens. This colony, however, affords an excellent opportunity to make life history and behaviour studies.

Harp Seal. *Phoca groenlandica* Erxleben

Herds of harp seals regularly appear on the coasts of the Gaspé Peninsula during the winter months. Although the greatest concentrations occur some distance out in the Gulf of St. Lawrence, especially in the vicinity of the Magdalen Islands, a few are found on the Gaspé coast.

White Whale. *Delphinapterus leucas* (Pallas)

The white whale occurs in the St. Lawrence River from Quebec City to the tip of the Gaspé Peninsula. It is said to be particularly abundant near the mouth of the Saguenay River, on the north shore of the river. When whale oil was used extensively for heating and lighting, this species was hunted to a greater degree than it is today. A few are taken each year and the oil is rendered for local use. Three were observed on May 26 at the Lower Razades Island, near Trois Pistoles, and one was seen near Bic Island on June 25.

Blackfish Porpoise. *Globicephala melaena* (Traill)

The blackfish porpoise is one of the most abundant cetaceans in the Gulf of St. Lawrence. From time to time herds are stranded along the shores of the Gaspé Peninsula and along the Lower St. Lawrence River. Préfontaine (1930) has definite specimen records of this species for Trois Pistoles.

Blue Whale. *Sibbaldus musculus* (Linnaeus)

The carcass of a female blue whale was washed ashore at Pointe-au-Père early in October, 1951. It measured 82 feet long and had a circumference of about 35 feet. It was identified by M. l'Abbé Etienne Talbot. An account and a photograph of the whale was published in the newspaper "Progrès du Golfe", October 5, 1951. The writer is grateful to Dr. D. A. Déry for bringing this record to his attention.

Canada Woodchuck. *Marmota monax canadensis* (Erxleben)

This species was common at Trois Pistoles, less so on the Gaspé Peninsula. At Trois Pistoles, woodchucks were a common sight in the open fields and meadows. Along the Dartmouth River on the Gaspé Peninsula, there was very little suitable habitat, but two were observed in a small, grassy clearing where a logging camp was once situated. None was observed at Grande Grève, although there was plenty of suitable habitat.

Although Anderson (1943) considered the woodchucks of the Gaspé Peninsula a distinct race (*johnsoni*), it is clear from a statistical analysis of cranial measurements and the comparison of pelage coloration that they are typical *canadensis*. One specimen (No. 2473) is unusually reddish, but this is not typical of the population as a whole, as is apparent in the other material. It is unfortunate that the describer chose this specimen as the type for his proposed race.

The proposed race, *johnsoni*, is described as having a greater zygomatic breadth, and rostrum and tooth row longer than in *canadensis*. The posterior border of the nasals is stated to be truncate rather than pointed. A statistical analysis shows that the ratio between the zygomatic breadth and the condylobasal length, and the maxillary tooth row and the condylobasal length falls well within the range of variation of *canadensis*. The shape of the posterior border of the nasals is variable in all races of this species.

Specimens examined: Gaspé Peninsula: 10; Alberta: 10; Manitoba: 4; New Brunswick: 4; Nova Scotia: 1; Quebec (other than Gaspé): 9.

Quebec Chipmunk. *Tamias striatus quebecensis* Cameron

Chipmunks were not uncommon at Trois Pistoles, although in the area around the Dartmouth River, there was little suitable habitat, and they were rather scarce. The shrubby borders and stone fences dividing the fields, as well as the numerous coppices of second growth poplar and maple provide favourable habitat in the Trois Pistoles area. The abundance of foxes and feral cats in the area must constitute a menace to the chipmunks. It was impossible to obtain definite information on reproduc-

tive successes, but a female collected on June 6 showed no evidence of previous breeding. All specimens collected had already acquired the complete summer pelage.

The chipmunks on the south shore of the Gulf of St. Lawrence are intergrades between *lysteri* and *quebecensis*, although somewhat closer to the latter.

Eastern Red Squirrel. *Tamiasciurus hudsonicus gymnicus* (Bangs)

One of the most common and conspicuous mammals at both Trois Pistoles and Cortereal. At Trois Pistoles, numerous conflicts ensued between squirrels in adjacent groves, and territorial behaviour was apparent during the period May 26 to June 10. At Cortereal, the squirrels were scattered among glades in the woods, and there was less opportunity for territorial strife. At Trois Pistoles most of the woods had been cleared away, and groves of sufficient size to support breeding pairs were at a premium. On June 2 a prolonged and bitter battle occurred between two squirrels, presumably in an attempt to gain possession of a small grove near a farm house. After several hours, one of them left the grove to seek shelter in a small apple tree where it remained for three days. There was no external evidence of injury, but it remained inactive on the same limb throughout the period and could be approached within a few feet without becoming alarmed. Early in the evening of June 4 it quickly descended from the apple tree and returned to the grove where the battle was resumed.

Considerable variation was noted in the rate at which the winter pelage was replaced by the duller summer fur. A male shot on May 29 retained much of the winter pelage, while another, shot on May 26, had acquired almost all of its summer coat. The May 29 specimen still retained the bright dorsal hairs on the tail, and patches of winter fur were still present on the left side behind the foreleg and in the area between the shoulder blades. Only a very small patch of long winter hair was present on the May 26 specimen.

It was not possible to determine breeding successes, but a female collected on May 26 proved to be barren. The mammæ showed no evidence that nursing was in progress.

Although specimens from Gaspé and the Trois Pistoles area are referable to *gymnicus*, they do show a decided tendency towards *loquax*. In size, they average about the same as specimens from Nova Scotia, but they are somewhat paler and brighter in coloration, not unlike that found in *loquax*. The outer fringes of the tail are paler than in *gymnicus*, although not so dark as in *loquax*. This is especially evident in the two specimens from Trois Pistoles.

Gaspe Flying Squirrel. *Glaucomys sabrinus goodwini* Anderson

Not uncommon on the Gaspé Peninsula and in the more densely wooded highlands along the south shore of the Gulf of St. Lawrence, according to woodsmen and trappers. The 1951 field party tried without success

to secure specimens in the valley of Dartmouth River. Anderson collected one specimen on the Grand Cascapedia River on September 27, 1923. This is the type specimen of the race described by him. Unfortunately, the lack of sufficient material makes it difficult to determine the validity of the race. The type specimen, however, appears to be very similar to *G. s. macrotis.*

New Brunswick Beaver. *Castor canadensis acadicus* Bailey and Doutt

Beaver are evidently very scarce on the Gaspé Peninsula and along the south shore of the St. Lawrence River. We found no evidence of beaver in the Dartmouth River area, and local woodsmen reported that no colonies are known to exist in that part of the Peninsula. River-drivers on the Grand Cascapedia River reported that occasionally sticks cut by beavers have been seen along that river. Goodwin (1924) picked up a skull at the forks of the Ste. Anne River.

Maritime Deer Mouse. *Peromyscus maniculatus abietorum* (Bangs)

This species was common at both Trois Pistoles and Cortereal. In the Trois Pistoles area it was less common than the red-backed mouse, especially in the damp woodlands. Traps set in mixed spruce-birch-maple woods, where there was plenty of leaf litter were most productive. A trap line extending from the edge of woodland swamp to the crest of a hill yielded mostly redbacks in the vicinity of the swamp, while deer mice predominated on the dry, semi-open uplands. Traps moved to new sites yielded adults the first night, with an increasingly larger proportion of immatures being taken on subsequent occasions.

At Cortereal, areas that were apparently trapped out were re-investigated after a two-week period, and it was found that the population density was approximately the same as before trapping was begun. However, the preponderance of immatures suggests that unoccupied territory is appropriated by young animals. It also suggests that immatures travel more than do adults. This is logical if it is assumed that adults have already established home territories.

Considering the colossal numbers of deer mice that have been collected by biologists down through the years, it is amazing how few have taken the trouble to study the habits of the animal. In view of this, it seemed desirable to extend our studies to include life history and behaviour studies whenever possible. Accordingly, six mature deer mice were live-trapped at Cortereal. First of all, we were interested in knowing what routes of travel are normally followed by these mice. This is important if the collector is to obtain the largest number of specimens in the short time that is usually at his disposal. In conducting the experiment, the mice were released about an hour after sundown at a point less than a hundred feet from the spot where they were trapped.

When released on the ground, they ran immediately to the nearest prostrate log along which they scurried, descending to the ground only to cross to another log. This was continued until they reached a brush pile, into which they disappeared. Fallen logs were plentiful in the area as wood-cutting operations had been going on for a period of years.

When trapping, most collectors place the traps on the ground beside a fallen log or at the base of a stump. Generally speaking, an old, well-rotted log is preferable, perhaps because the mice frequent them more, as food is likely to be more abundant than near a freshly-cut log. There is also the possibility that the mice have established a regular route along these logs, which may not hold true for fresh cuttings. Whether this species is repelled or attracted by unfamiliar objects in its environment has not been determined.

In view of the fact that apparently the mice ordinarily travel along the tops of fallen logs rather than on the ground may indicate that traps intended for them should be set in such situations. Undoubtedly when bait is used, the results would show little significant difference, but under certain circumstances it may be important. For example, if a light rain leeches the bait, rendering it unpalatable and destroying the odour, the results may be quite significant. When trapping without bait, the placement of traps is most important.

Two mice were released in trees. One placed at a height of 5 feet in a small red maple (8 in. d.b.h.) immediately descended to the ground, although it did not appear to be ill-at-ease. The tail was effectively used as a balancing organ. The other, released at a height of 6 feet on the trunk of an old yellow birch (24 in. d.b.h.), ascended about 15 inches, then slowly descended, spiral-fashion, to the ground where it disappeared in a hole among the roots. At one point it crept under a piece of loose bark where it remained for several seconds. It seems probable that had there been an entrance to a cavity along its route it would have entered it. It seemed completely at ease in the trees, and it is probable that these mice are more arboreal than is generally realized.

Specimens:

Trois Pistoles: 5 ♂♂; 6 ♀♀.
Average measurements of 4 adult males: 184 – 94·5 – 21·5
Average measurements of 4 adult females: 184 – 93·8 – 22
Cortereal: 24 ♂♂; 18 ♀♀.
Average measurements of 7 adult males: 170 – 86·7 – 21·7
Average measurements of 8 adult females: 175 – 94·4 – 21·7

Compared with Nova Scotia material of *abietorum* the Trois Pistoles specimens are noticeably browner and are not unlike those from northern and western New Brunswick. They are, however, greyer than specimens of *gracilis* from Ontario. When arranged in series, a cline in dorsal coloration is apparent, ranging from the greyest specimens in Nova Scotia and Prince Edward Island to the brownest in Ontario. An apparent interruption in the cline is apparent in the area around the St. Lawrence River. Specimens from the north side of the river (Lake St. John) average browner than those from Trois Pistoles and Gaspé. Gaspé specimens are slightly darker (more brownish) than those from Trois Pistoles. Presumably the St. Lawrence River is an effective barrier separating populations of this species.

Preble's Lemming Mouse. *Synaptomys borealis sphagnicola* Preble

A single specimen of this species was collected by R. M. Anderson on Table-top Mountain, Gaspé County, on September 18, 1923. This rodent is very local in distribution, and the collector who encounters a concentration is very fortunate indeed.

Ochraceous Red-backed Mouse. *Clethrionomys gapperi ochraceus* (Miller)

Red-backed mice were abundant at both Cortereal and Trois Pistoles. The best trapping returns were obtained in moist sub-climax woodlands, often near water, where there was an abundance of underbrush and leaf litter. At Trois Pistoles most of the specimens were taken in a second growth spruce-maple-birch woods, through which flowed a sluggish stream. Traps set close to fallen, semi-decayed logs yielded the most specimens. Specimens were taken in all types of weather conditions, but the largest takes were made on warm, moonless nights.

The forest cover on the Gaspé Peninsula is predominantly coniferous, with a small percentage of birch and maple. Along the river-banks and in the vicinity of logging camps, such shrubs as red-osier dogwood (*Cornus stolonifera*) and red-berried elder (*Sambucus racemosa*) grow in profusion with alder (*Alnus rugosa*). In such situations, red-backs were abundant.

Specimens:

Trois Pistoles: 8 ♂♂; 3 ♀♀.
Cortereal: 18 ♂♂; 13 ♀♀.

When compared with a good series of *C. g. ochraceus* from northern and western New Brunswick (45), it is evident that the Gaspé specimens (88) are definitely referable to that race. Both with respect to coloration and cranial measurements they are typical *ochraceus*.

In southeastern Canada, three races of *Clethrionomys* occur: *rufescens* in Nova Scotia, *ochraceus* in New Brunswick and Prince Edward Island, and *gapperi* in southern Quebec (west of the St. Lawrence River) and southern Ontario. All three races are well defined. The nominate race is very dark with strong reddish dorsal coloration, while *rufescens* is both paler and duller dorsally. *C. g. ochraceus* lacks the reddish dorsal coloration of these two forms, the predominant colour being a strong ochraceous. Therefore, these three races can be separated with a minimum of difficulty.

Anderson (1943) described the Gaspé population as a new race *gaspeanus*, and in his original description he compares it with both *rufescens* and *gapperi*. Unfortunately he does not appear to have compared it with *ochraceus*, since he does not state in what respects it differs from that race. With such a large series of specimens (88), the writer, however, was in a position to make a thorough study, and it is evident that this race is invalid.

Examination of all the available material of *Clethrionomys* from eastern Canada reveals that *ochraceus* occurs throughout the province of Prince Edward Island and the province of New Brunswick (with the possible exception of the extreme southeast corner), the Gaspé Peninsula, and

the south shore of the St. Lawrence River, south and west at least to Trois Pistoles. In view of the fact that the Trois Pistoles specimens show no indication of intergradation with any of the neighbouring races, it is suspected that *ochraceus* also occurs south to the Eastern Townships. In the United States this race occurs in Maine, New Hampshire, and Vermont, intergrading with the nominate race in northern New York state.

Acadian Meadow Mouse. *Microtus pennsylvanicus acadicus* Bangs

Meadow mice were rather uncommon at Trois Pistoles, even in apparently good habitat. Local residents told us that they were much more abundant 2 years previous, which would seem to indicate a low in the cycle in 1951. Four specimens were taken in a grassy glade in a subclimax spruce-birch-maple woodland, not far from a meadow. The heavily wooded valley of Dartmouth River, near Cortereal, where collecting was carried on, was not suitable for this species, and only two were secured.

Goodwin (1929) referred the thirty-eight specimens of *Microtus* collected by him on the Gaspé Peninsula to the race *fontigenus,* although he remarks that they are not typical of that race. Rand (1943) examined fourteen specimens from the Gaspé Peninsula and sixty-one from northern New Brunswick and decided that they should be assigned to *pennsylvanicus,* although certain New Brunswick specimens approached *acadicus* in colour. Unfortunately, Bailey (1900) had no specimens from Gaspé when he made his revision of the genus *Microtus.* However, he states that *M. p. pennsylvanicus* "In a general way occupies the Transition Zone . . .", while *fontigenus* occurs in the Hudsonian Zone. Since the Gaspé Peninsula is typical Canadian Zone, obviously neither of these forms would be expected to occur there. Rand extended the range of *pennsylvanicus* to include the Gaspé Peninsula, although Bailey's interpretation appears to be more nearly correct.

M. p. acadicus is a well-defined race differing from *pennsylvanicus* in general coloration, being a pale brown tinged with yellowish or clay colour, as opposed to the dark brown coloration of the latter, as shown by a series of near topotypes in the National collection. *M. p. fontigenus* is a poorly defined race, as pointed out by Davis (1936), and appears to be merely an intergrade between *pennsylvanicus* and *enixus.*

A re-examination of the material in the National Museum of Canada collection reveals that the subspecific characters separating *acadicus* and *pennsylvanicus* are most pronounced in the adults and that the immatures are so variable that even specimens from the type localities often resemble those of the other race. It seems important, therefore, to compare only adults in comparable pelage.

When arranged in series, specimens from western and northern New Brunswick are almost indistinguishable from Nova Scotia specimens of *acadicus.* Those from the Gaspé Peninsula are similar, but the yellowish tinge is more dilute and the specimens are greyer. The Trois Pistoles specimens exhibit little of this coloration but are much paler than typical *pennsylvanicus.*

The range of *M. p. acadicus,* therefore, includes all of Nova Scotia (including Cape Breton Island), Prince Edward Island, New Brunswick, the Gaspé Peninsula, and the south shore of the St. Lawrence River south at least to Trois Pistoles. It almost certainly occurs along the international boundary in northern Maine.

Specimens examined:

Nova Scotia: 87; Prince Edward Island: 2; New Brunswick: 68 (Gloucester Co., 47; Victoria Co., 1; Madawaska Co., 18; Charlotte Co., 2); Eastern Quebec: 22 (Bonaventure Co., 13; Gaspé Co., 4; Trois Pistoles, 5); Southern and Central Quebec: 143; Ontario: 102; Pennsylvania: Ardmore, 3; New Jersey: Ocean Cox, 2; New York: Long Island, 3.

Rock Vole. *Microtus chrotorrhinus chrotorrhinus* (Miller)

Goodwin (1929) collected ten specimens in the Cascapedia River area, and R. M. Anderson secured a specimen at Mount Albert, Gaspé County, in 1922. Apparently very local in distribution.

Eastern Muskrat. *Ondatra zibethica zibethica* (Linnaeus)

The muskrat is relatively scarce both at Trois Pistoles and on the Gaspé Peninsula. Because of the rugged nature of the terrain, there are few ponds or marshes of any magnitude. The sparse population of the south shore of the St. Lawrence River is further depleted by intensive trapping. Local residents reported that there is a fairly large population of muskrats near the estuary of the Grand Cascapeda River. There are three specimens in the National Collection from this area.

Norway Rat. *Rattus norvegicus* (Erxleben)

Common at both Trois Pistoles and on the Gaspé Peninsula. In the fishing villages along the Gaspé coast, fish offal provides an abundant and easily accessible source of food.

House Mouse. *Mus musculus domesticus* Rutty

A common household pest at both Trois Pistoles and in the villages and towns on the Gaspé Peninsula. One was trapped in a log cabin on Dartmouth River.

Meadow Jumping Mouse. *Zapus hudsonius canadensis* (Davies)

This species was not taken in 1951. There is one specimen from Percé, Gaspé County, collected August 14, 1914. Goodwin (1924) collected six specimens at Ste. Anne des Monts and one in the Cascapedia River area. This mammal appears to be rather scarce on the Gaspé Peninsula.

The one specimen available for study has the bright yellow side coloration characteristic of *Z. h. canadensis.*

Eastern Woodland Jumping Mouse. *Napaeozapus insignis insignis* (Miller)

This species was apparently uncommon both at Trois Pistoles and Cortereal. One was taken along the banks of a small stream near Trois Pistoles, where poplar, choke cherry, elder, mountain maple, and raspberry formed an almost impenetrable tangle. The trap was set near a large rock amongst a thick leaf litter. The specimen was so badly damaged,

presumably by shrews, that only a part of the skin could be saved. The occipital region of the head and skull were eaten away and most of the brains extracted. Subsequent trappings were unproductive. On June 6 a jumping mouse, perhaps this species, was observed at the edge of a shrubby border.

Two specimens, male and female, were trapped on July 11, at Cortereal. A line of twenty-five traps had been set in a dense growth of raspberry, red-osier dogwood, and young spruce that had become established on a ridge of earth thrown up during the construction of a wood road. On previous occasions red-backed and deer mice were taken here, and most of the other traps held specimens of these mice on July 11. Subsequent trappings failed to yield jumping mice. The apparent scarcity of this species may be due to the abundance of the other two species; the latter may have entered the traps before jumping mice had an opportunity to do so.

The six specimens from the Gaspé Peninsula compare favourably with a series of *N. i. insignis* from New Brunswick (8) and Nova Scotia (2). Anderson (1942) described the Gaspé Peninsula population as a new race, *gaspensis,* but there appears to be nothing to justify recognition of this form. Two of the specimens (No. 4786, the type specimen, and No. 12471) exhibit that peculiar orange coloration on the sides, characteristic of jumping mice taken in water traps. Presumably this adventitious coloration led the describer to suppose that a well-defined race occurs in this area. However the two specimens collected in 1951 show none of the characteristics ascribed to this race, and there is no reason to believe that the coloration has been in any way altered due to the methods used in collecting. In all respects, the Gaspé specimens appear to be typical *insignis.*

Eastern Porcupine. *Erethizon dorsatum dorsatum* (Linnaeus)

The porcupine is common all along the south shore of the St. Lawrence from Levis to the tip of the Gaspé Peninsula. It occurs both in the interior forests and in the spruce groves scattered along the coasts. Near Trois Pistoles, where there are many summer cottages, it is a great nuisance and does considerable damage.

Nova Scotia Snowshoe Hare. *Lepus americanus struthopus* Bangs

Snowshoe hares were scarce at both Trois Pistoles and Cortereal. A female collected on July 14 was emaciated and heavily infested with ticks. There is an apparent scarcity of this species throughout eastern Canada. The supply of hares in Nova Scotia during the winter of 1951-52 could not meet the demand, and they were selling at enhanced prices. Local residents in the Cortereal area reported that rabbits have been scarce for the last six or seven years.

The female measured: total length: 470, tail: 42, hind foot: 133.

This race is poorly defined and appears to be merely an intergrade between *americanus* and *virginianus.*

Northern White-Tailed Deer. *Odocoileus virginianus borealis* (Miller)

Deer were relatively common in the Trois Pistoles area, less so on the Gaspé Peninsula. Reports from local residents indicate a fairly high density in the Matapedia Valley, but, as a result of unfavourable habitat, the numbers grow progressively fewer as one moves eastward into the Peninsula. In the extreme northeastern section of the Peninsula the greatest concentration is said to be in the vicinity of Douglastown. A doe was observed near Trois Pistoles on May 24, and numerous tracks were seen along the river courses. Two bucks were seen on June 30 along the Dartmouth River. One was probably about four years old, the other a spike buck.

There is very little evidence in the Gaspé Peninsula of heavy deer browsing, probably because the population is so low. Evidence of the winter browsing of red and mountain maple, white birch, red-berried elder, withe-rod and June berry was noted. In one area on the Dartmouth River where several deer had obviously wintered, the twigs of the hardwoods were heavily browsed. Although white cedar is common, there was little evidence of heavy browsing of this species.

Eastern Moose. *Alces americanus americanus* (Clinton).

Moose occur in fair numbers on the Gaspé Peninsula according to woodsmen and hunters, but the population appears to be slowly decreasing. In the Trois Pistoles area it is rare. At Cortereal, tracks were observed along the Dartmouth River. Most of the Gaspé Peninsula is being cut over, and much of the suitable habitat is being destroyed. Whether, through a continued closed season maintained for a 5-year period, the moose population can be increased is problematical. Sportsmen in the area feel that by so doing the population can be kept at least at its present level. In the past, the Gaspé Peninsula has been regarded as one of the finest areas for moose in eastern Canada. From observations made in the Dartmouth River area, the writer concludes that the destruction of habitat is more detrimental to the moose than is illegal killing, which most sportsmen hold responsible for the decline.

Eastern Woodland Caribou. *Rangifer caribou caribou* (Gmelin)

Caribou still occur in small numbers in the interior of the Gaspé Peninsula. Fortunately, Gaspé Park embraces a part of the range occupied by these mammals, so that they are at least assured of protection here. Because the caribou herds throughout the province have been diminishing at an alarming rate, the Quebec Government decided to remove the woodland caribou from the game list until such time as the population might reach a point where it was felt safe to permit hunting.

Woodsmen in the Dartmouth River area reported that caribou occasionally wander down near the coasts during the winter but that in summer they are found only on the higher mountains.

64201—13

BIBLIOGRAPHY

1. Alcock, F. J. Geology of the Chaleur Bay region. Dept. of Mines, Geol. Surv, Canada, Mem. 183, pp. 1-146. 1935.
2. Anderson, Rudolph Martin. Mammals of the Province of Quebec. Annual Report, Provancher Society of Natural History of Canada, Quebec, 1938, pp. 50-114. 1939.
3. ——— Six additions to the list of Quebec mammals with descriptions of four new forms. Annual Report, Provancher Society of Natural History of Canada, Quebec, 1941, pp. 31-43. 1942.
4. ——— Nine additions to the list of Quebec mammals with description of six new forms. Annual Report, Provancher Society of Natural History, Quebec, 1942, pp. 49-61. 1943.
5. ——— Catalogue of Canadian Recent Mammals. National Museum of Canada, Bulletin No. 102, pp. 1-238. 1946.
6. Annual Report, Province of Quebec Association for the Protection of Fish and Game, 1951.
7. Bailey, Vernon. Revision of American voles of the Genus *Microtus*. North American Fauna No. 17, pp. 1-88, 1950.
8. Cameron, Austin W. A new chipmunk (*Tamias*) from Ontario and Quebec. Jour. of Mammalogy, Vol. 31, No. 3, pp. 347-348, 1950.
9. Cameron, Austin and Phillip A. Orkin. Mammals of the Lake St. John Region, Quebec. Ann. Rept., National Museum of Canada, 1948-49, pp. 95-108, 1950.
10. Davis, David E. Status of *Microtus enixus* and *Microtus terraenovae*. Jour. of Mammalogy, Vol. 17, No. 3, pp. 290-291, 1936.
11. Fernald, M. L. Persistence of plants in unglaciated areas of Boreal America. Amer. Acad. Arts and Science Mem. 15, pp. 241-342, 1925.
12. Goodwin, George G. Mammals of the Gaspé Peninsula, Quebec. Jour. of Mammalogy, Vol. 5, No. 4, pp. 246-257, 1924.
13. ——— Mammals of the Cascapedia Valley, Quebec. Jour. of Mammalogy, Vol. 10, No. 3, pp. 239-246, 1929.
14. Halliday, W. E. A forest classification for Canada. Dept. of Mines and Resources, Canada, Forest Service Bull. 89, pp. 1-50, 1937.
15. Prefontaine, Georges. *Notes sur Globicephala Melaena* (Traill). Annual Report, Provancher Society of Natural History, Quebec, 1930, pp. 49-66, 1930.
16. Rand, A. L. Canadian forms of the meadow mouse (*Microtus pennsylvanicus*). Canadian Field-Naturalist, 57: 115-123, 1944.
17. Scoggan, H. J. The flora of Bic and the Gaspé Peninsula, Quebec. National Museum of Canada, Bull. 115, pp. 1-399, 1950.
18. Smith, Ronald Ward. The land mammals of Nova Scotia. The American Midland Nat., Vol. 24, No. 1, pp. 213-241, 1940.
19. Wynne-Edwards, V. C. Isolated Arctic-alpine floras in eastern North America: a discussion of their glacial and recent history. Roy. Soc. Canada, Trans. 111 (5), 31: 1-26, 1937.

NOTES ON BIRDS OF THE AREA OF INTERGRADATION BETWEEN EASTERN PRAIRIE AND FOREST IN CANADA

By W. Earl Godfrey

INTRODUCTION

The information on Manitoba birds here recorded was derived from seven sources. The following descriptions of these information sources are preceded by the year date in which the information concerned was gathered. These correspond with the year dates used in the systematic list and will therefore readily identify the respective sources from which information given in the systematic list was derived.

1921: In the period June 25 to August 27, P. A. Taverner of the National Museum, and Hoyes Lloyd of the National Parks Bureau, travelling by auto, train, and boat, made a reconnaissance of parts of central southern, southwestern, and central western Manitoba. They travelled from Virden to Clandeboye Bay, southern Lake Manitoba, in the period June 25 to July 8, with short stops at Oak and Whitewater Lakes, Turtle Mountain, Spruce Woods Forest Reserve, Carberry, and Austin. From July 9 to 24 they were in the interlake region visiting St. Laurent, Lake St. Francis, Oak Point, Steep Rock, Peonan Point, Fairford, Lake St. Martin, and Shoal Lake. An overnight trip to Selkirk and back was made from Winnipeg, July 24 and 25. Between July 26 and 31 they travelled by train to Dauphin and visited Pine River, Duck Mountain, and Winnipegosis village. From Winnipegosis, August 1 to 4, they travelled by boat the length of Lake Winnipegosis stopping at Birch, Whisky Jack, and Goose Islands. Returning to Winnipegosis village on August 4, they travelled by rail to The Pas. On August 8 they travelled down Saskatchewan River to Moose Lake, returning to The Pas on August 15. Between August 16 and 19 they visited Dauphin and Riding Mountain. They then returned to Winnipeg and on August 22 went to Selkirk. On Lake Winnipeg they travelled by boat, reaching Hecla Island on August 23. On succeeding days they visited McBeth Point, Reindeer Island, and Limestone Cave Point. They arrived back at Selkirk on August 27. A small collection of birds made by Taverner is in the National Museum, and specimens taken by Lloyd are in the Lloyd collection. Taverner's notes have been used in the present report.

1929: Between June 1 and September 15, 1929, C. H. D. Clarke, while working on a pulpwood cruise, made observations on birds at Moose and Cedar Lakes. Dr. Clarke's manuscript list of birds has been freely quoted in the present report.

64201—13½

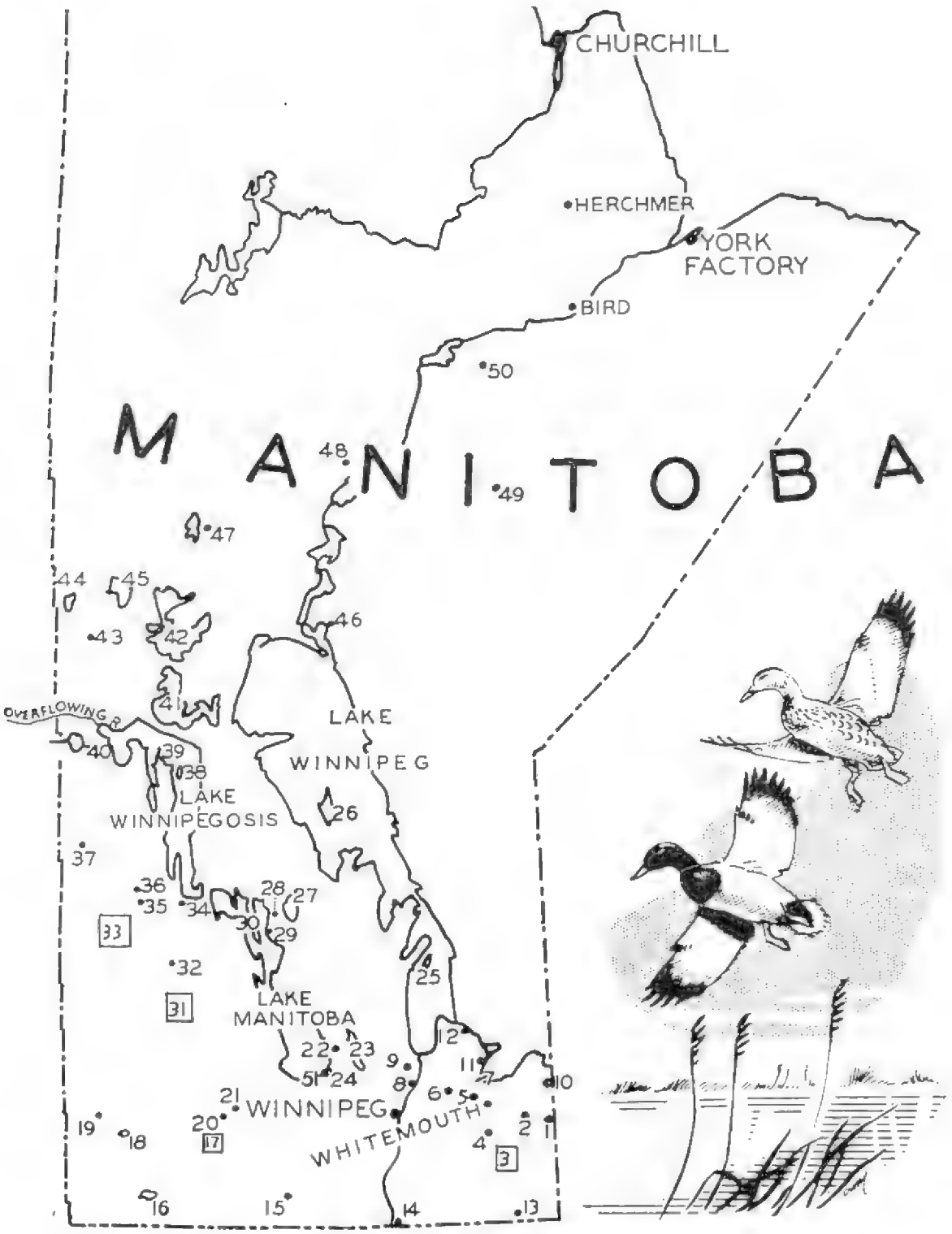


Figure 12. Map of Manitoba showing localities mentioned in text.

KEY TO LOCALITIES

21. Austin
6. Beausejour
10. Big Whiteshell L.
38. Birch I.
20. Carberry
41. Cedar L.
51. Clandeboye Bay
45. Cormorant L.
32. Dauphin
33. Duck Mt.
14. Emerson
28. Fairford
35. Garland
25. Hecla I.
50. Ilford
5. Julius
11. Lac du Bonnet
15. La Rivière
24. Lake St. Francis
27. Lake St. Martin
42. Moose L.
46. Norway House
18. Oak L.
49. Oxford House
30. Peonan Point
9. Petersfield
12. Pine Falls
36. Pine R.
40. Red Deer R.
26. Reindeer I.
2. Rennie
4. Reynolds
31. Riding Mt. Nat. Park
44. Rocky L.
22. St. Laurent
3. Sandilands Forest Res.
8. Selkirk
7. Seven Sisters Falls
23. Shoal L.
13. Sprague
17. Spruce Woods Forest R.
29. Steep Rock
37. Swan R.
43. The Pas
48. Thicket Portage
19. Virden
47. Wekusko L.
1. West Hawk L.
39. Whiskey Jack I.
16. Whitewater L.
34. Winnipegosis

1936: A National Museum party composed of P. A. Taverner (until July 21), Ronald W. Smith, and T. E. Randall collected bird specimens and data along the Hudson Bay Railroad from June 19 to September 14. The itinerary was as follows:

Herchmer, Mile 412, June 21-July 2
Bird, Mile 349, July 3-17
Ilford, Mile 286, July 18-30
Thicket Portage, Mile 185, August 1-31
Cormorant Lake, Mile 42, September 1-14

Specimens collected and field notes, written by Taverner, for the period June 2 to 26, and by Smith, from July 22 to September 14, are in the National Museum.

1937: A National Museum expedition made up of P. A. Taverner (until June 26), Angus H. Shortt, and William Watkins worked in central western Manitoba in the period June 2 to August 27. The itinerary was as follows:

The Pas (Reader and Halcrow Lakes), June 2-20
Swan River, June 23-July 20
Garland, July 23-August 4
Duck Mountain, August 6-27

Field notes were written by Taverner from June 2-20; by Shortt for the remainder of the season. These and the bird collection made are in the National Museum.

1938: A party composed of Angus H. Shortt and R. Sutton collected birds and data in Manitoba for the National Museum between June 3 and July 31. The itinerary was as follows:

Dauphin, June 3-24
Riding Mountain Park, near Clear Lake, June 25-July 31

1949: Nick Neufeld, Technical Officer on a National Herbarium summer botanical survey under the leadership of H. J. Scoggan, collected for the National Museum about twenty-five birds. The party worked from Norway House along the canoe route of the Nelson-Eschimamish-Hayes Rivers system to York Factory and back up the Nelson River from its mouth to Limestone Rapids. Plant collecting was done also in the Wekusko Lake area, and three birds were taken.

1951: W. Earl Godfrey, accompanied by Colin L. Thacker, collected bird specimens and data for the National Museum in Manitoba from May 31 to August 9, 1951. The greater part of the time was spent in the poorly-understood southeastern corner of the province where much intergradation takes place between many bird subspecies. Camp I was at Whitemouth from June 1 to July 13 and from August 6 to 9. From this base, the country west to Julius and east to Rennie was most intensively investigated. In addition, two or more trips were made north to Pine Falls and Big Whiteshell Lake; east to the Ontario border; south to Reynolds and the northern part of Sandilands Forest Reserve; and west to Winnipeg. On July 14 the party moved to Emerson and on the following day to Sprague. July 16 was

spent at Sprague and Middleboro, in the extreme southeastern part of the province. On July 17 the party left for The Pas, arriving there on July 19, having made overnight stops and evening observations at La Rivière and Dauphin. On July 21 Camp II was set up near the mouth of Overflowing River. In the period July 21 to August 4, parts of the forests along the road south to Red Deer River and north to The Pas were worked, as also were the extensive marshes of northwestern Lake Winnipegosis, mainly between the mouth of Overflowing River and a point some nine miles south.

SYSTEMATIC LIST

In the subjoined list it should be understood that a figure enclosed in parentheses following a date is the number of bird individuals observed on that date.

Common Loon. *Gavia immer* (Brünnich)

One specimen: Duck Mountain.

1951: Observed at Winnipeg Beach, May 31 (1); Seven Sisters dam, June 10 (3), 17 (3), July 11 (1). Near Overflowing River mouth it was regularly seen but not more than four per day; young noted July 23. *1938*: Breeding in Riding Mountain. *1937*: Young and adults in Duck Mountain, August 6-27, where the species was common. Near The Pas singles were seen on June 5 and 7. *1936:* From one to six seen daily (September 1-14) at Cormorant Lake. Common in August at Thicket Portage, where an adult with half-grown young was observed.

Pacific Loon. *Gavia arctica pacifica* (Lawrence)

Breeds on several lakes near Herchmer where noted in daily numbers one to four, June 1 to July 1, 1936, and where two sets of eggs were collected on June 25 and 26 respectively.

Red-necked Grebe. *Colymbus grisegena holböllii* (Reinhardt)

Two specimens: Duck Mountain.

Observations at Seven Sisters dam, June 10-17, 1951; Riding Mountain (young, June 7, July 1, 29, 1938); Duck Mountain (adults and young daily, August 6-27, 1937); Overflowing River, July 21-August 3, 1951; Cormorant Lake (1 juv., September 9, 1936); Thicket Portage (juv. taken August 24, 1936, but specimen destroyed by dogs).

Horned Grebe. *Colymbus auritus* Linnaeus

Three specimens: Riding Mountain, The Pas.

In Riding Mountain, adults with young were noted July 18, 27, 28, and August 12, 1938. Quite common and breeding on Halcrow Lake, near The Pas, June 2-20, 1937. Not uncommon at Cormorant Lake. One noted at Thicket Portage, September 14, 1936.

Eared Grebe. *Colymbus caspicus californicus* (Heermann)

One observed by the writer near Petersfield on May 31, 1951.

Western Grebe. *Aechmophorus occidentalis* (Lawrence)

Rather common on the bay near mouth of Overflowing River, July 26-31, 1951, where as many as eighty were seen on July 26 by the writer. It apparently has not heretofore been recorded in Manitoba north of Waterhen Lake, in the interlake area, where James Macoun secured two specimens, now in the National Museum, on May 27, 1881, and implied that it was breeding (Macoun and Macoun, 1909).

Pied-billed Grebe. *Podilymbus podiceps podiceps* (Linnaeus)

Two specimens: Swan River, Thicket Portage.

1951: Flightless young noted with adults near Whitemouth, June 24 and July 6. An adult noted at Overflowing River, July 24, and two near The Pas on July 23. *1937*: At Garland ten were seen on July 26; and at Swan River flightless young were seen on July 29. *1936*: An immature male collected at Thicket Portage on August 23. At Cormorant Lake one to three were seen almost daily, September 1 to 14.

White Pelican. *Pelecanus erythrorhynchos* Gmelin

Riding Mountain: Ten seen in flight July 1, and one on South Lake July 2, 1938. Near the mouth of Overflowing River: Noted daily in numbers between eleven and eighty-seven, July 19 to August 3, 1951. The Pas: Small flying flocks, June 2, 3, 6, and 12, 1937. Woody Lake (Mile 86 H.B. Railroad): "Considerable flock." June 20, 1937.

Double-crested Cormorant. *Phalacrocorax auritus auritus* (Lesson)

Observations at Riding Mountain: one on July 12, 1938; Duck Mountain: one on August 14, 1937; Overflowing River area: two to four on July 30, August 2 and 3, 1951; Cormorant Lake: occasional one or two. Twenty in flight on September 16, 1936.

Great Blue Heron. *Ardea herodias herodias* Linnaeus

Observations at Whitemouth, Rennie, West Hawk Lake in daily numbers one to five, June 9-July 12, 1951; Sprague: July 15 (1), 16 (1); Riding Mountain: Occasional individuals in flight over Clear Lake, June 9-July 31, 1938, and Taverner in 1921 recorded that it is said to breed in Riding Mountain; Dauphin: June 9 (1); Duck Mountain: August 23 (1); Overflowing River: One seen on July 21, 25, and 30; two on August 3 and 9, 1951; Taverner saw one at The Pas and one at Moose Lake in August, 1921.

Black-crowned Night Heron. *Nycticorax nycticorax hoactli* (Gmelin)

The writer saw one at Petersfield on May 31, 1951, and two near Sprague July 16. Taverner in 1921 saw one at Heartney, eight at Oak Lake, five at Clandeboye, two at Peonan Point, and six on Red River below Selkirk.

American Bittern. *Botaurus lentiginosus* (Montagu)

Three specimens: Thicket Portage.

Fairly common summer resident in marshes at Whitemouth, Rennie, Sprague, Clear Lake, Dawson Bay, The Pas, Cormorant Lake, and Thicket Portage. Nests found near Clear Lake, Riding Mountain, on July 6 (two eggs) and July 8 (fledglings).

Canada Goose. *Branta canadensis* subsp.

Breeds in the Boggy Creek marshes near Whitemouth (eggs and downy young taken by Robert Latta of Whitemouth for propagation purposes). Taverner and Lloyd in 1921 saw eight at Clandeboye Bay on July 8, and eight at Oak Point, July 11. On Lake Winnipegosis marshes near Overflowing River, the writer saw one on July 24, fourteen on July 26, and forty-two on August 2, 1951; also a photograph of an adult and four downies taken by Leo LePine on June 11, 1951, on Overflowing River was examined. Occasional flying flocks of about six birds noted by Taverner near The Pas, June 2 to 20, 1937. At Herchmer an adult and six goslings were noted on June 29, 1936, by Taverner. No breeding specimens are available for subspecific determination.

White-fronted Goose. *Anser albifrons* subsp.

A lone bird, apparently adult, was carefully observed by the writer in marshes some eight miles south of the mouth of Overflowing River on July 30, 1951, and was approached to within about 110 yards. It was feeding on grasses, flushed strongly, and flew out of sight. A Royal Canadian Mounted Policeman, who was familiar with this species, later told me that this bird had summered in the same area in 1950. I know of no other summer record for Manitoba.

Common Mallard. *Anas platyrhynchos platyrhynchos* Linnaeus

Four specimens: Cedar Lake, Reindeer Island.

Nests or young noted at Whitemouth, Big Whiteshell Lake, Sprague, La Rivière, Turtle Mountain, Peonan Point, Lake St. Martin, St. Laurent, Birch Island, Swan River, Overflowing River, The Pas, and Ilford. Fairly common at Cormorant Lake and Thicket Portage. Only observation at Ilford was of an adult with brood on June 25, 1936.

Black Duck. *Anas rubripes* Brewster

At Seven Sisters dam the writer saw four on June 17 and three on July 1, 1951.

Gadwell. *Anas strepera* Linnaeus

Observations at Seven Sisters dam, July 17, 1951 (1); Clandeboye Bay, July 9, 1921 (2); Red River mouth, August 27, 1921 (50); The Pas, June 16, 1937 (1) and July 19, 1951 (2); Thicket Portage, August 19 (2), 20 (2), and 23 (5), 1936.

American Pintail. *Anas acuta tzitzihoa* Vieillot

National Museum field parties have noted nests or young at Seven Sisters dam, Lac du Bonnet, La Rivière, Peonan Point, St. Laurent, Shoal Lake, Riding Mountain, Swan River, Overflowing River, The Pas, Thicket Portage, and Herchmer. Taverner in his 1921 reconnaissance found this the commonest duck.

Green-winged Teal. *Anas carolinensis* Gmelin

Adults with young at Overflowing River; Moose and Cedar Lakes (Clarke MS.); and at Ilford (brood of ten, July 27, 1936). Summer obser-

vations at Whitemouth, Seven Sisters dam, La Rivière, Reindeer Island, The Pas, Thicket Portage (quite common), and Herchmer where seen on June 25 (6), 30 (2), and July 1 (1), 1936.

Blue-winged Teal. *Anas discors* Linnaeus

Observed in summer at Sprague, Whitemouth, La Rivière, Lac du Bonnet, Whitewater Lake, Turtle Mountain, Clandeboye Bay, Oak Point, Duck Mountain, Overflowing River, Riding Mountain, and Thicket Portage (small numbers August 19-31, 1936). Adults with young at Overflowing River, Duck Mountain, The Pas, and Riding Mountain.

Baldpate. *Mareca americana* (Gmelin)

One specimen: Riding Mountain.

Broods of young observed at Seven Sisters dam, Riding Mountain, Overflowing River mouth, and The Pas. Observed in summer at many other localities.

Shoveller. *Spatula clypeata* (Linnaeus)

Breeding at Riding Mountain, Oak Point, Peonan Point, and delta of Saskatchewan River. Breeding at The Pas, June 19, 1936. Noted by Clarke (MS.) as not uncommon about Moose and Cedar Lakes. Three observed by the writer on Seven Sisters dam on June 17, 1951.

Redhead. *Aythya americana* (Eyton)

One specimen: Big Whitefish Lake.

Observed at La Rivière, July 17, 1951 (1); Riding Mountain, July 29, 1938 (2); Big Whitefish Lake, August 14, 1921; The Pas, June 20, 1937 (2).

Ring-necked Duck. *Aythya collaris* (Donovan)

Specimens: The Pas (2 sets of eggs).

Nests or broods of young at Riding Mountain and The Pas. At The Pas two sets of eggs were collected on June 18, 1936. Summer observations at Seven Sisters dam, West Hawk Lake, Rennie, and Duck Mountain.

Canvas-back. *Aythya valisineria* (Wilson)

Specimens: Saskatchewan River near Cedar Lake and Riding Mountain.

Nests or broods of young observed at Killarney, Riding Mountain, Clandeboye Bay, Peonan Point, Fairford River, Lower Saskatchewan River, The Pas, and Overflowing River.

Lesser Scaup. *Aythya affinis* (Eyton)

One specimen: Ilford.

Nests or broods of young at Riding Mountain, Lower Saskatchewan River near Cedar Lake, The Pas, and Ilford. Summer observations east to Lac du Bonnet (fourteen on June 19, 1951) and Seven Sisters dam (twelve on July 1, 1951).

American Golden-eye. *Bucephala clangula americana* (Bonaparte)

Observed with broods of young near Seven Sisters dam, Riding Mountain, Fairford River, Lake St. Martin, Swan River, Moose and Cedar Lakes.

Buffle-head. *Bucephala albeola* (Linnaeus)

At La Rivière, the writer saw a brood of nine on July 18, 1951. Taverner and parties noted it at Birch Island (two on August 1, 1921); Cormorant Lake (September 11 and 12, 1936).

White-winged Scoter. *Melanitta deglandi deglandi* (Bonaparte)

Clarke (MS.) found "a flock of well-grown young on a small lake at the extreme north end of Cedar Lake" on July 16, 1929. Taverner (MS.) and Lloyd noted it in two's and three's at several points in their 1921 summer traverse. One was seen by Taverner's party at Cormorant Lake, September 10 and 13, 1936.

Surf Scoter. *Melanitta perspicillata* (Linnaeus)

In 1936, singles at Herchmer, June 22 and 23, and at Ilford, July 28.

American Scoter. *Oidemia nigra americana* Swainson

Singles at Herchmer, June 23 and 24, 1936.

Ruddy Duck. *Oxyura jamaicensis rubida* (Wilson)

Two broods of young near Lena, July 18, 1951. Clarke (MS.) saw young between Moose and Cedar Lakes, July 15, 1929. Noted in summer at Caliente, La Rivière, Killarney, Riding Mountain, and The Pas.

Hooded Merganser. *Lophodytes cucullatus* (Linnaeus)

One specimen: Swan River.

A brood of young at Swan River, June 29, 1937. Adults noted in summer at Rennie, La Rivière, Turtle Mountain, near mouth of Overflowing River, and The Pas.

American Merganser. *Mergus merganser americanus* Cassin

Three specimens: Cormorant Lake and Bird.

Broods of young observed in Riding Mountain, July 26, 1938; at Cormorant Lake, September 5, 1936, and (Clarke, MS.) along rivers near Moose and Cedar Lakes. Summer adults at Seven Sisters dam (seven on July 1, 1951), and at Bird. Mergansers of this or the following species were recorded from a number of other localities.

Red-breasted Merganser. *Mergus serrator serrator* Linnaeus

An adult female and six young were observed closely by the writer 11 miles east of Seven Sisters dam on July 7, 1951.

Turkey Vulture. *Cathartes aura* subsp.

Observed in 1951 between Whitemouth and Rennie on June 5 (1), 13 (1), 15 (1), 19 (1), 23 (2), 25 (1), July 4 (1); Jessica Lake, June 20 (1); Seven Sisters dam, July 7 (1), 11 (2), 12 (3); West Hawk Lake, June 26 (1). One in Duck Mountain, August 13, 1937, where Taverner (1927) had earlier recorded its breeding. Noted near Dauphin: Two on June 3 and singles on June 9 and 11, 1938. On July 19, 1951, Thacker and the writer flushed one 18 road miles north of Mafeking where it had been feeding on a dead hare (*Lepus americanus*). On July 25, perhaps the same individual was seen some 25 road miles north of Mafeking. Lloyd (1922) recorded a specimen taken at Dawson Bay, September 15, 1913.

Eastern Goshawk. *Accipiter gentilis atricapillus* (Wilson)

Clarke (MS.) on June 22, 1929, saw an adult at Moose Lake, the behaviour of which left little doubt that it had a nest or young near by. In 1936 one was noted several times (July 3-17) at Bird; one seen on three or four occasions at Thicket Portage in August; and two immatures at Cormorant Lake, September 2 and 5.

Eastern Sharp-shinned Hawk. *Accipiter striatus velox* (Wilson)

Four specimens: Thicket Portage, Riding Mountain, Overflowing River.

1951: Observed near Whitemouth, June 16 (1); Seven Sisters, July 12 (1); Overflowing River, July 24 (2), August 4 (1). *1921:* Riding Mountain, August 19 (several). *1937:* Occasional observations at Swan River, Duck Mountain, and The Pas. *1936:* Ilford, late July, (2); Thicket Portage, occasionally noted throughout August, August 23 (7). Cormorant Lake, seen occasionally in first half of September.

Cooper Hawk. *Accipiter cooperii* (Bonaparte)

Observed (*1951*) near Rennie, June 26 (1) and near Whitemouth, June 29 (1); in *1921*, near Hecla Island, Lake Winnipeg, August 23 (12), and on the lower Saskatchewan River, August 14 (1); in *1938* near Dauphin, June 3 (2), 9 (1), 11 (1).

Eastern Red-tailed Hawk. *Buteo jamaicensis borealis* (Gmelin)
Western Red-tailed Hawk. *Buteo jamaicensis calurus* Cassin
Krider Red-tailed Hawk. *Buteo jamaicensis kriderii* Hoopes

Eight specimens: Dauphin, Poplar Point, Swan River, Overflowing River, Cormorant Lake, Ilford.

1951: Singles noted on June 5, 6, 12, 18, 21, 22, 29, July 4, 6, and 11 in the country between Whitemouth and West Hawk Lake. At Sprague a nest on July 15 contained two young. One was noted near Vita on July 17, and on July 18 eleven were seen as we drove between La Rivière and Dauphin. Near Overflowing River it was recorded on July 20 (2), 23 (1), 24 (3), 27 (2), 28 (1), 30 (1), 31 (2), August 1 (2), 2 (1), 9 (2). *1938:* At least two pairs resident near Dauphin. A nest with two young about three days old found on June 6. Nest contained the remains of five Richardson Ground Squirrels *Citellus richardsonii* and one Franklin Ground Squirrel *Citellus franklinii.* In Riding Mountain a few adults were observed in flight. *1937:* At Swan River (June 23-July 30) it was the commonest hawk and several nests containing downy young were found. Nested also at Garland and it was more or less regularly observed in Duck Mountain (August 6-27) and near The Pas (June 2-20). *1936:* A few were seen at Cormorant Lake in migration, September 1-14. At Thicket Portage observed on only two occasions in August when both adults and immatures were seen together. At Ilford recorded as "rare, seen only occasionally, one or two birds". A juvenile was taken on July 30 at the last locality. A breeding female from Oak Lake in southwestern Manitoba is referable to *kriderii.* The writer saw three whitish-tailed adults on July 18 between La Rivière and Killarney, but two

seen earlier in the day at La Rivière had red tails like *Borealis* or *calurus*. Farther east at Vita, a whitish adult superficially like *kriderii* was noted on July 17. *B. j. kriderii* evidently is the breeding bird of extreme southwestern Manitoba. Four or five breeding specimens from Shoal Lake are nearer *borealis*, while a fifth is closer to *calurus* in its barred tail (but not otherwise). That series is therefore much closer to *borealis*. Probably *borealis* is the bird breeding in most of eastern Manitoba. A single breeding female from Overflowing River approaches *calurus* in tail barring, perhaps indicating that this race reaches eastward in Canada to central western Manitoba.

Broad-winged Hawk. *Buteo platypterus platypterus* (Vieillot)

Two specimens: Otter Falls, Duck Mountain.

In *1951*, nesting near Otter Falls: singles noted at Big Whiteshell Lake, June 20; Hazelridge, June 22; Rennie, July 5; near Whitemouth, July 10; Vita, July 15; Pine River, July 19; and in the Overflowing River area, July 21 (2), 25 (1), and 31 (1). In *1921* noted at Fairford, July 16 and 20; Selkirk (1); and one in Riding Mountains, August 17. In *1938* one seen near Dauphin, June 16. In *1937*, a few noted at Swan River and Duck Mountain; one at Halcrow Lake on June 17.

Swainson Hawk. *Buteo swainsoni* Bonaparte

The writer in *1951* noted a single near Oak Bank, June 22, and two near La Rivière on July 18.

American Rough-legged Hawk. *Buteo lagopus s. johannis* (Gmelin)

In *1951* the writer closely observed one, apparently a migrant, on May 31 near Petersfield; on July 28 another was seen some fifty miles south of The Pas. In *1936* one was seen at Herchmer on June 29 and 30; at Bird one noted several times; Ilford, four singles, July 18 to 30; Thicket Portage, a single on August 9 and 10.

Northern Bald Eagle. *Haliaeetus leucocephalus washingtonii* (Audubon)

In *1921* observed at Duck Mountain, July 29 (1), at McBeth Point and Reindeer Island, Lake Winnipeg, August 25 (1) and 26 (1). In *1937* one was seen in Duck Mountain on August 8 and 15; in *1951*, one near mouth of Overflowing River, July 25. In *1936* an immature at Thicket Portage, August 6, and it was said to have nested at Landing Lake near by. Clarke in *1929* found an occupied nest on Burnt Island in Moose Lake, one on the east shore of Cedar Lake, and another on the south shore of the latter.

Marsh Hawk. *Circus cyaneus hudsonius* (Linnaeus)

Seven specimens: Julius, Riding Mountain, Duck Mountain, Dauphin, Thicket Portage, Herchmer, Swan River.

In *1951*, noted almost daily in small numbers about Whitemouth, Rennie, and Sprague; only slightly less common about Overflowing River. Stomach of male taken at Julius, June 30, 1951, contained fur and bones of Franklin Ground Squirrel (*Citellus franklinii*) and an egg of the Red-winged Blackbird (but no feathers)! Nest at Dauphin, June 6, *1938*, and

Swan River, July 3, *1937*. In *1936*, at Herchmer, September 8 (1) and 9 (1); Thicket Portage, one or two daily, August 1 to 31; Bird, two observations; Herchmer, June 23 (1).

Osprey. *Pandion haliaëtus carolinensis* (Gmelin)

In *1951*, singles noted near Overflowing River, and a nest with two young about ready to fly was found there on July 27. In *1936*, singles were seen almost daily at Thicket Portage throughout August, and near Bird, July 3-17.

Eastern Pigeon Hawk. *Falco columbarius columbarius* Linnaeus

Specimens: Two skins, one set of eggs: Herchmer.

In *1936*, noted occasionally at Herchmer, nest of five eggs taken June 22; at Thicket Portage a family group on August 6. Singles of undetermined subspecies noted at Cormorant Lake on September 5, *1936*, near Overflowing River, July 28, *1951*.

The two adult males from Herchmer are closer to the nominate race than to *bendirei*. I have seen no specimens from central western and northwestern Manitoba.

Eastern Sparrow Hawk. *Falco sparverius sparverius* Linnaeus

Fifteen specimens: Swan River, Garland, Cormorant Lake, The Pas, Riding Mountains, Bird.

In *1951*, common in suitable habitat in the Whitemouth, Rennie, and Sprague areas: much less common about Overflowing River. In *1938*, scarce at Dauphin and Riding Mountains. In *1937*, common at Swan River (where nesting) and Garland; not common in Duck Mountain; fairly common at The Pas (where nesting). In *1938*, fairly common at Cormorant Lake first week of September, scarce second week; common at Thicket Portage, August 1 to 31; rare at Ilford, July 18 to 30; several nesting at Bird, July 3 to 17.

Hudsonian Spruce Grouse. *Canachites canadensis canadensis* (Linnaeus)

Six specimens: Overflowing River, Duck Mountain, Halcrow Lake, Thicket Portage.

In *1951*, we were told that this grouse occurs in coniferous bogs in the Whitemouth region; noted but once near Overflowing River, where an adult male was taken on July 24. In *1938:*, one seen in Riding Mountain. In *1937*, not common in Duck Mountain but young seen on several occasions; one on June 17 and 19 at The Pas. In *1936*, observed only on August 14 (one adult and eight young). In *1929*, Clarke found it common in all wooded areas about Moose and Cedar lakes and saw many broods.

Gray Ruffed Grouse. *Bonasa umbellus umbelloides* (Douglas)

Thirteen specimens: Rennie, Overflowing River, Garland, Swan River, Thicket Portage, Duck Mountain, Dauphin, Riding Mountain, Wekusko Lake.

Broods of young noted near Lac du Bonnet, Great Falls, Rennie, Turtle Mountain, Duck Mountain, Dauphin, Riding Mountain, Swan River, Garland, Overflowing River, Moose and Cedar Lakes, Wekusko Lake, and Thicket Portage.

Two adult males from Rennie seem closer to *umbelloides* than any other race, considering colour and tarsal feathering.

Keewatin Willow Ptarmigan. *Lagopus lagopus albus* (Gmelin)

Specimens: Three skins, one set eggs: Herchmer.

1936: At Herchmer it was found widely scattered over the muskeg by Taverner's party, June 21 to July 2. A set of ten eggs, in which incubation was well advanced, was taken on June 26.

Northern Sharp-tailed Grouse. *Pedioecetes phasianellus phasianellus* (Linnaeus)

Great Plains Sharp-tailed Grouse. *Pedioecetes phasianellus jamesi* Lincoln

Prairie Sharp-tailed Grouse. *Pedioecetes phasianellus campestris* Ridgway

Seventeen specimens: Whitemouth, Overflowing River, Riding Mountain, Garland, The Pas, Cormorant Lake, Thicket Portage, Herchmer.

1951: Noted in small numbers (not more than ten per day) locally about Whitemouth, Julius, Rennie, Piney, and some eight miles south of the mouth of Overflowing River. Three young were seen near Whitemouth on July 4 and 6, and three young also 8 miles south of Overflowing River, August 1. *1938:* Eighteen were seen between June 3 and 24 at Dauphin. In Riding Mountain (Octopus Lake) an adult and four young seen July 23. *1937:* Scarce but breeding (young seen) at Swan River, Garland, and The Pas. *1936:* One noted on September 2 and one on September 5 at Cormorant Lake. At Thicket Portage several were seen every few days in August, fifteen being the greatest daily number (August 26). At Ilford broods of three or four were seen on July 23 and 24. It was rare at Herchmer and Bird in 1936.

The Whitemouth specimens are perhaps nearer *campestris* but are far from typical. A juvenal from Riding Mountain is apparently closer to *jamesi*. A juvenal and a worn adult from Overflowing River are almost exactly intermediate between *jamesi* and the nominate race. Birds from The Pas and northward are referred to the nominate race.

Greater Prairie Chicken. *Tympanuchus cupido pinnatus* (Brewster)

One specimen: Peonan Point, Lake Manitoba.

1921: One was seen at St. Laurent but date not recorded. An adult female was collected at Peonan Point on July 14.

European Partridge. *Perdix perdix perdix* (Linnaeus)

1951: We noted a single 7 miles west of Whitemouth on June 10 and another near Beausejour on June 22.

Whooping Crane. *Grus americana* (Linnaeus)

Specimen: Two wings from Rocky Lake.

1937: N. Reader, of Reader Lake, gave Taverner a pair of wing tips of this species which came from a bird killed by an Indian in spring, 1936, at Rocky Lake. Mr. Reader told of killing this crane at Reader Lake years ago when he was a boy.

Little Brown Crane. *Grus canadensis* subsp.

1937: Taverner's party saw three on June 4 and twenty-five on June 8, flying over Reader Lake. *1936:* At Ilford three were seen on July 19. Presumably these belong to the nominate race, but no specimens were taken.

Virginia Rail. *Rallus limicola limicola* Vieillot

Five specimens: Near Whitemouth, Swan River, Riding Mountain, and Halcrow Lake (near The Pas).

1951: We found it common in suitable habitat near Whitemouth. especially in the extensive Boggy Creek marshes. Taverner's party in *1938* took a juvenal at Clear Lake, Riding Mountain, August 10. *1937:* Taverner's party took one at Swan River, June 30, another on July 10, and saw one on July 17. They took a male at Halcrow Lake, near The Pas on June 14, and saw another there. Clarke (MS.) saw it twice in *1929* in the Moose and Cedar Lakes area.

Sora. *Porzana carolina* (Linnaeus)

Seven specimens: Duck Mountain, Douglas, Overflowing River. Riding Mountain, Swan River, Reindeer Island.

National Museum parties have observed it in *1951* at Julius, Whitemouth, Elma, Otter Falls, Lac du Bonnet, Seven Sisters dam, Caliento, Sprague, and near Overflowing River, and The Pas; in *1921* at Reindeer Island, Lake Winnipeg; in *1938* at Riding Mountain and Dauphin; in *1937* at Swan River, Garland, Duck Mountain, and The Pas. In *1936,* Taverner's party observed one or two birds from time to time at Thicket Portage. Clarke (MS.) saw it once in the Moose and Cedar Lakes area.

Yellow Rail. *Coturnicops noveboracensis noveboracensis* (Gmelin)

Specimen: Reader Lake.

Undoubtedly commoner than the records indicate. In *1951* the writer heard the unmistakable notes of two in a grassy marsh 2 miles north of Whitemouth, July 10, and one in a marsh near Rennie, July 11, and in several places in the Overflowing River area, July 25, 26, 27, and 30. Taverner's party heard it at Reader Lake and collected a specimen on June 3, *1937.*

American Coot. *Fulica americana americana* Gmelin

Three specimens: Moose Lake.

In *1951* we noted it in one's and two's at Petersfield, Lac du Bonnet, Whitemouth, and a few miles east of Rennie. Taverner in *1921* saw it at Oak Point, Fairford River, and the delta of Saskatchewan River at Cedar Lake. Taverner's party in *1938* found it fairly common on Octopus Lake, Riding Mountain; in *1937,* a few at Swan River, Garland, and Reader Lake, but common and nesting at Halcrow Lake. Clarke in *1929* found it

common in parts of the Moose and Cedar Lakes area; and R. W. Smith in *1936* estimated about seven hundred in the southwestern part of Moose Lake and collected three immatures on September 10.

Semipalmated Plover. *Charadrius hiaticula semipalmatus* Bonaparte

Seven specimens: Overflowing River, Bird, Cormorant Lake, Herchmer.

In *1951*, five were observed at La Rivière, July 18; noted also in the Overflowing River area, July 21 (4), 27 (17), 28 (14), 30 (12), August 1 (8), 2 (7), 3 (2). Taverner's party in *1937* saw a few at Halcrow Lake, June 2 to 8; and in *1936* found about four pairs nesting at Bird and nesting rather commonly at Herchmer where a set of four eggs was taken on July 1.

Belted Piping Plover. *Charadrius melodus circumcinctus* (Ridgway)

Specimen: Overflowing River.

In *1951*, on a sand beach, some eight miles south of Overflowing River, on Dawson Bay, the writer, on July 21 and 24, observed two adults accompanied by two young (juvenal plumage well developed, and young able to fly). On the latter date one of the stub-tailed, short-winged juvenals was collected. Largest number noted there on August 1, when three adults and four young were seen, but all were exceedingly wary. The behaviour of the adults and the small size of the young left little reason to doubt that they had bred there.

Killdeer. *Charadrius vociferus vociferus* Linnaeus

Specimens: Dauphin, The Pas.

In *1951*, noted daily in small numbers in the Whitemouth and Overflowing River area. Taverner's parties in other years recorded it from Dauphin, Riding Mountain, Swan River, Garland, The Pas, etc. Farther north, in *1936*, it was common and breeding at Ilford and Bird; much scarcer at Herchmer, where a nest was found on July 1.

American Golden Plover. *Pluvialis dominica dominica* (Müller)

Specimen: Cormorant Lake.

An immature female collected on September 7, and another specimen noted on September 13, both in *1936*, at Cormorant Lake.

Black-bellied Plover. *Squatarola squatarola* (Linnaeus)

Three specimens: Cormorant Lake.

In *1936*, Taverner's party saw "one or two immatures several times during the second week of September" at Cormorant Lake, and three were taken. In *1937*, "some numbers" were noted near The Pas on June 2, but by June 8 only three remained.

Ruddy Turnstone. *Arenaria interpres morinella* (Linnaeus)

Two specimens: The Pas.

Taverner noted "a few" near The Pas, June 2 to 8, *1937*. Two males collected.

American Woodcock. *Philohela minor* (Gmelin)

The writer observed one closely on July 14 in the Red River valley near Emerson.

Wilson Snipe. *Capella gallinago delicata* (Ord)

Three specimens: The Pas, Herchmer, Ilford.

In *1951* it was noted near Elma, June 11 (1), 12 (3); Otter Falls, June 14 (1), July 11 (2); Julius, June 16 (1); Lac du Bonnet, June 19 (1); Seven Sisters dam, July 1 (1); and in the Overflowing River area, July 21 (3), 25 (4), 26 (1), 27 (2), August 2 (1). Taverner's parties recorded single birds in Riding Mountain and Duck Mountain. In *1937,* they found it common near The Pas; in *1936,* common at Thicket Portage during latter half of August; at Ilford, one or more seen daily, a flightless immature taken on July 29; at Bird it was heard almost every evening; at Herchmer it was heard daily.

Upland Plover. *Bartramia longicauda* (Bechstein)

One specimen: Garland.

Three on July 31, *1937,* at Garland, of which one was collected. This had traces of natal down on hind neck.

Spotted Sandpiper. *Actitis macularia* (Linnaeus)

Ten specimens: Riding Mountain, The Pas, Duck Mountain, Swan River.

In *1951,* frequently noted in southeastern Manitoba. Four downy young on June 20 at Jessica Lake. A nest at Whitemouth, June 24, held four eggs, on July 2 contained three downies and one egg at 10 a.m., was empty at 4.50 p.m. Taverner's parties noted it but once at Dauphin, saw two pairs at Riding Mountain, two nesting pairs at Swan River, noted it in Duck Mountain. They found it common and breeding at The Pas, Bird, and Herchmer; noted it also at Thicket Portage and Ilford.

Eastern Solitary Sandpiper. *Tringa solitaria solitaria* Wilson

Twenty-seven specimens: Garland, Riding Mountain, Duck Mountain, Overflowing River, Thicket Portage, Ilford, Bird, Swan River.

1951: We noted one near The Pas, July 23, four (two collected) on August 2 at Overflowing River, and another on August 3. *1938:* At Riding Mountain two singles noted at Clear Lake, June 26 and July 31, becoming more numerous in early August. *1937:* At Swan River an adult male was collected July 12. No others seen. At Garland several were noted, July 23 to August 4; at Duck Mountain one to four were seen almost daily, August 13 to 27. *1936:* At Herchmer occasionally seen, but no nests found. One was collected at Bird; it had a brood patch. Common at Ilford and breeding in tamarack swamps where several nests of robins had been used by this sandpiper; one nest collected contained fragments of sandpiper eggs. Of twelve adults taken, eleven are males, which strongly suggested to Taverner that "the male takes care of the young, and the female has little to do with their raising." At Thicket Portage it was rather uncommon. The twelve adults from Herchmer and one from Bird clearly indicate that the nominate race breeds north at least to those points.

Western Solitary Sandpiper. *Tringa solitaria cinnamomea* (Brewster)

One specimen: Riding Mountain.

An immature male taken at Riding Mountain on August 1, 1938, is of this race and undoubtedly is a migrant.

Willet. *Catoptrophorus semipalmatus* subsp.

One seen at Reader Lake near The Pas on June 2, 1937, by A. H. Shortt.

Greater Yellow-legs. *Totanus melanoleucus* (Gmelin)

Nine specimens: Ilford, The Pas, Bird, Cormorant Lake, Overflowing River.

1951: Observed near Overflowing River on July 21 (20), 23 (10), 24 (15), 25 (5), 26 (12), 27 (6), 28 (5), 30 (7), August 1 (4), 2 (6), 3 (12). *1937:* At The Pas it was seen on June 2 (1), 8 (1). *1936:* At Cormorant Lake several were seen daily, September 1 to 14; Thicket Portage August 27 (1); Ilford, not common, but adults behaved as though they had young; Bird, July 5 (1), 6 (1), 8 (a pair collected, the actions of which strongly suggested breeding).

Lesser Yellow-legs. *Totanus flavipes* (Gmelin)

Six specimens: Riding Mountain, The Pas, Thicket Portage, Herchmer.

1951: Otter Falls, July 11 (14); Overflowing River, daily numbers of from eight to forty-six, July 21 to August 3. *1938:* At Riding Mountain first noted on July 4. *1937:* Swan River, July 9 (1); Duck Mountain, only three between August 6 and 27; The Pas, very common and breeding and a downy young taken June 16 at Halcrow Lake. *1936:* Thicket Portage, August 19 (9), 23 (1); Ilford, common and evidently breeding; Bird, fairly common, evidently breeding; Herchmer, locally common and several nests found.

American Knot. *Calidris canutes rufus* (Wilson)

A flock of eight noted by Taverner's 1937 party at Reader Lake on June 2.

Pectoral Sandpiper. *Erolia melanotos* (Vieillot)

Two specimens: Thicket Portage.

1951: La Rivière, July 18 (4); Overflowing River, July 21 (5), 24 (2), 27 (4), 30 (9). *1937:* Duck Mountain, August 20 (1). *1936:* Thicket Portage, August 28 (5); Cormorant Lake, September 9 (1).

Baird Sandpiper. *Erolia bairdii* (Coues)

Three specimens: Thicket Portage, Riding Mountain, Overflowing River.

1951: La Rivière, July 18 (15); Overflowing River, July 21 (3), 27 (3), 30 (5), August 1 (14). *1938:* Riding Mountain, August 10 (1). *1936:* Thicket Portage, August 28 (7).

Least Sandpiper. *Erolia minutilla* (Vieillot)

Three specimens: Thicket Portage, Ilford, Herchmer.

1951: At Whitemouth a flock of seven was seen on June 8 and 9, an individual on July 10 in a muskeg north of Whitemouth. At La Rivière forty were seen on July 18; and in the bay marshes area at the mouth of Overflowing River the species was seen on July 25 (1), 28 (2), 30 (8), August 1 (6). *1936:* Cormorant Lake, September 3 (4), 5 (1); Thicket Portage, August 19 (15); Ilford, July 26 (1), 31 (1); Bird, July 16 (1); Herchmer, nesting in small numbers.

Inland Dowitcher. *Limnodromus griseus hendersoni* Rowan

One specimen: Halcrow Lake near The Pas.

Taverner on June 10, *1937,* took at Halcrow Lake the only specimen the party saw, an adult female. In *1951,* we recorded a single individual at La Rivière, July 18; and singles at the mouth of Overflowing River on July 25 and 30.

Stilt Sandpiper. *Micropalama himantopus* (Bonaparte)

One specimen: Thicket Portage.

In *1936,* Taverner's parties saw 'several' at Ilford on July 23 and collected a solitary bird on August 19 at Thicket Portage. In *1951,* the writer observed thirty-eight at La Rivière on July 18, and two on July 21, August 1 and 3, in the Overflowing River area. Clarke (MS.) saw "a fine flock" on August 10, *1929,* at Cedar Lake.

Semipalmated Sandpiper. *Ereunetes pusillus* (Linnaeus)

Two specimens: Bird, The Pas.

Taverner's parties collected one at Bird on July 16, *1936,* and a male near The Pas on June 16, *1937.* In *1951* we saw nine near Overflowing River on July 21.

Buff-breasted Sandpiper. *Tryngites subruficollis* (Vieillot)

1951: Two noted by the writer on July 27 on the bay shore 8 miles south of the mouth of Overflowing River.

Marbled Godwit. *Limosa fedoa* (Linnaeus)

Three specimens: The Pas.

1936: Taverner saw one 11 miles north of The Pas on June 20.

1937: Near The Pas three seen at Reader Lake on June 2 (one taken), and at Halcrow Lake, also, three were seen on June 15 and 16 (two taken latter date). *1951:* Two appeared near our camp at Whitemouth spending the afternoon of June 8 about small temporary pools in a ploughed field. Clarke (MS.) saw one on July 13, *1929,* near Burnt Island, Moose Lake.

Wilson Phalarope. *Steganopus tricolor* Vieillot

Five specimens: The Pas.

Taverner, in *1937,* recorded a male at Garland on August 2; found it quite common and breeding at Reader and Halcrow Lakes, near The Pas. In *1951,* we noted it near the mouth of Overflowing River on July 21 (1), 23 (4), 27 (1), August 1 (2), 3 (7).

Herring Gull. *Larus argentatus smithsonianus* Coues

Four specimens: Bird and Lake Winnipeg (Egg Island, Reindeer Island).

Observed in small numbers at Whitemouth, Riding Mountain, The Pas, Cormorant Lake, Ilford, and Herchmer. Fairly common at Thicket Portage, apparently breeding. At Bird, too, Taverner suspected its breeding. In *1921,* Taverner saw from ten to one hundred and thirty-five each day on Lake Winnipeg north to Reindeer Island.

Ring-billed Gull. *Larus delawarensis* Ord

Five specimens: Thicket Portage, Riding Mountain.

Noted in Riding Mountain, The Pas, near Overflowing River (as many as fifty-four in a day), Thicket Portage, Cormorant Lake, and Moose Lake. Clarke (MS.) thought it was occupying islands at the north end of Moose Lake but had no opportunity to verify this.

Franklin Gull. *Larus pipixcan* Wagler

Seven specimens: The Pas, Overflowing River, Birch Island.

1951: Noted in small numbers about Whitemouth, Seven Sisters dam, and Lac du Bonnet; as many as sixty-seven in a day (June 13) in the flat, marshy country north of Whitemouth. Abundant and breeding (flightless young) in bay marshes near Overflowing River mouth. Congregated in evening on a beach, 8 miles south of Overflowing River, where greatest numbers conservatively estimated at 4,000 on July 23, but by August 3 numbers had dwindled to 375. (A similar abrupt decrease in numbers was noted by the writer at Cardinal Lake, Alta., after mid-July 1950). *1938:* Individual birds at Dauphin and in Riding Mountain. *1937:* Small flocks at Garland. Very common on Reader and Halcrow Lakes, near The Pas, but no evidence of breeding.

Bonaparte Gull. *Larus philadelphia* (Ord)

Seven specimens: Riding Mountain, Ilford, Herchmer.

1951: Noted near mouth of Overflowing River on July 20 (2), 21 (1), 25 (1), August 3 (2). *1938:* About four pairs nesting in spruces near South Lake, Riding Mountain. *1937:* Noted at Duck Mountain, August 7 (2), 10 (2). *1936:* Breeding in spruces bordering muskeg ponds at Herchmer where a set of three eggs was collected on June 22. At Ilford locally quite common in late July. At The Pas 300 were noted on September 16.

Forster Tern. *Sterna forsteri* Nuttall

Six specimens: Oak Point, Overflowing River, Clandeboye Bay, Halcrow Lake.

1951: In the bay marshes near the mouth of Overflowing River, July 21 (1), 24 (1), August 3 (2). *1921:* Taverner noted about twenty at Clandeboye Bay, saw others at Oak Point, Peonan Point, mouth of Red River. *1937:* Three at Halcrow Lake, near The Pas, June 15 and 16. Clarke (MS.) found it locally common in the Moose and Cedar Lakes area.

Common Tern. *Sterna hirundo hirundo* Linnaeus

Fourteen specimens: Overflowing River, Riding Mountain, Clandeboye Bay, Ilford, Bird, Wekusko Lake.

1951: Small numbers (8-18) at Seven Sisters dam and Lac du Bonnet. Daily in bay marshes near Overflowing River mouth, where as many as 105 were seen in a day (August 2). Often they carried small fish, and other behaviour suggested breeding. *1921:* Common on large lakes traversed by Taverner. *1938:* Three or four daily at Clear Lake, Riding Mountain. *1937:* Three on August 20 and 21 in Duck Mountain. *1936:* Common at Bird on Nelson River, where breeding on a sandbar. Two downies collected on July 12. At Ilford, Thicket Portage, and Cormorant Lake it was quite common.

Arctic Tern. *Sterna paradisaea* Pontoppidan

One specimen: Herchmer.

Taverner's party at Herchmer collected an adult male on June 22, *1936*. Other terns were observed occasionally, but the species could not be identified.

Caspian Tern. *Hydroprogne caspia* (Pallas)

Two specimens: Peonan Point.

1951: Noted in the bay near the mouth of Overflowing River on July 19 (1), August 2 (3), 3 (2). *1921:* Taverner noted it at Peonan Point, July 13 (2); on Big Whitefish Lake, August 14 (1) and 15 (1); and Reindeer Island, August 25 (1). *1936:* At Cormorant Lake, September 9 (1), 12 (2). Several over Moose Lake, September 9. Clarke (MS.) found it in three places, one on Moose Lake and two on Cedar Lake.

Black Tern. *Chlidonias niger surinamensis* (Gmelin)

Eleven specimens: Swan River, Great Falls, Overflowing River, Riding Mountain, The Pas, Oxford House.

Observed in various numbers, depending apparently on available habitat, at Whitemouth, Seven Sisters dam, Great Falls, Sprague, near the mouth of Overflowing River, Swan River, Garland, Riding Mountain, Duck Mountain, The Pas, and also at most of the localities visited by Taverner in *1921*. Breeding at Whitemouth, Overflowing River, Swan River, and The Pas. An adult male was collected at Oxford House on July 1, 1949, by N. Neufeld.

Western Mourning Dove. *Zenaidura macroura marginella* (Woodhouse)

Five specimens: Julius, Swan River, Dauphin, Riding Mountain.

1951: Noted in small numbers, no more than eight in a day, in the Whitemouth area. Apparently commoner about Sprague where twelve were seen on July 16. *1921:* Taverner found it common north to Oak Point, noted one at Peonan Point. *1938:* Uncommon at Dauphin; rare in Riding Mountain where noted twice. *1937:* Scarce at Swan River, but several pairs noted. At Garland not uncommon in small family flocks.

One of the two Julius specimens tends somewhat toward *carolinensis*.

Black-billed Cuckoo. *Coccyzus erythropthalmus* (Wilson)

Five specimens: Swan River, Rennie.

1951: Within a 15-mile radius of Whitemouth noted on June 4 (1), 11 (1), 19 (1), 21 (1), 25 (2), 27 (1) 28 (5), 29 (1), July 2 (1), 3 (1), 6 (1), 9 (3), 10 (2); near Sprague, July 16 (1), 17 (1). *1921:* Taverner noted it daily north to Oak Point, saw one at Grahamdale, two at Riding Mountain August 18. *1938:* Heard twice at Dauphin. One sight record at Riding Mountain. *1937:* At Swan River one on July 9 and ten noted on July 10, and others were seen on succeeding days. Noted several times at Garland.

Arctic Horned Owl. *Bubo virginianus subarcticus* Hoy

Ten specimens: Thicket Portage, Dauphin, Cormorant Lake, Swan River, Overflowing River.

1951: At Otter Falls two calling July 11; near the mouth of Overflowing River, July 21 (1 ad.), 28 (1 ad.); young heard calling July 24, 28, and 31, and one was collected on August 1. *1938:* Heard often in Riding Mountain. At Dauphin two adults were seen and two immatures were taken on June 10. *1937:* Noted at Garland, Duck Mountain, and The Pas. At Swan River an adult and two young were collected on July 6. *1936:* One taken at Cormorant Lake, September 4. Common at Thicket Portage where two adults and three immatures were taken August 23 to 29. Noted also at Ilford and Herchmer. Noted only once at Bird.

American Hawk Owl. *Surnia ulula caparoch* (Müller)

One specimen: Thicket Portage.

1936: A worn adult male taken at Thicket Portage on August 12 where no others were seen. Taverner noted also 'several' at Mile 245, Hudson Bay Railroad, but did not record the date. In *1929*, Clarke (MS.) saw several in the Moose and Cedar Lakes region.

Western Burrowing Owl. *Speotyto cunicularia hypugaea* (Bonaparte)

Two specimens: Oak Lake, Poplar Point.

In *1921*, Taverner saw one between Boissevain and Heartney and two near Oak Lake, July 3 and 4; took a male at the last locality on July 4. He took another at Poplar Point, July 8. In *1951*, the writer found a nest with at least two well-developed young about five miles northeast of Emerson on July 14. One of the parents was noted also.

Eastern Long-eared Owl. *Asio otus wilsonianus* (Lesson)

Western Long-eared Owl. *Asio otus tuftsi* Godfrey

Two specimens: Swan River, Herb Lake.

1951: One noted at La Rivière on July 17. *1937:* An adult female was collected at Swan River on July 17. *1949:* The National Herbarium Manitoba botanical party took a female at Herb Lake on August 30.

The specimen from Swan River and four from Oak and Whitewater Lakes are definitely referable to *tuftsi*. The Herb Lake specimen is nearer *wilsonianus*.

Short-eared Owl. *Asio flammeus flammeus* (Pontoppidan)

In *1921*, one noted at mouth of Red River, August 27. In *1936*, one on July 20 and another on July 31 at Ilford.

Saw-whet Owl. *Aegolius acadicus acadicus* (Gmelin)

On the evening of June 5, *1951*, the writer heard the unmistakable call-notes of this owl some nine miles west of Rennie.

Eastern Whip-poor-will. *Caprimulgus vociferus vociferus* Wilson

In *1951*, heard in the Whitemouth area on June 3 (4), 5 (4), 9 (8), 11 (2), 23 (7), 24 (1), 28 (2). At Sprague, July 16 (1). In *1921*, Taverner recorded it at Auston, Steep Rock, and Selkirk.

Eastern Nighthawk. *Chordeiles minor minor* (Forster)

Fifteen specimens: Overflowing River, Whitemouth, Thicket Portage, Swan River, Riding Mountain, Bird, Duck Mountain, The Pas.

1951: Noted in daily numbers from one to seven in the Whitemouth area; in daily numbers from one to four near Overflowing River. *1938:* At Dauphin a few, thought to be migrants, were seen June 3 to 6, but not thereafter. Uncommon in Riding Mountain. *1937:* A few seen regularly at Swan River where a nest contained two partly-fledged young on July 7. Fairly common at Garland and Duck Mountain. Common near The Pas. *1936:* Common at Thicket Portage, Ilford, and Bird. At Bird, two sets of two eggs were taken July 4 and 5.

Sennett Nighthawk. *Chordeiles minor sennettii* Coues

One specimen: Thicket Portage.

On August 27, *1936*, three post-juvenal nighthawks were collected at Thicket Portage from a flight of about thirty-five individuals. Two are perfectly typical of the nominate race; the third, a female, is strikingly different. Because of its finely vermiculated pale grey upper parts, with black blotches and streaks almost entirely wanting, it seems unquestionably referable to *sennettii*. It presumably is an example of post-juvenal wandering north of the normal range.

Chimney Swift. *Chaetura pelagica* (Linnaeus)

In *1951*, although we noted it several times at Winnipeg and Portage la Prairie, we saw it but once farther east: two on June 5, at Whitemouth. In *1921*, Taverner noted it at St. Laurent, Winnipeg, Selkirk, and Dauphin; nesting in a hollow tree at Selkirk. In *1938*, it was noted 'in fair numbers" at Dauphin. Clarke (MS.) noted that it was "seen locally. Not particularly common" in *1929*, in apparently the Moose and Cedar Lakes region, but definite localities were not given.

Ruby-throated Hummingbird. *Archilochus colubris* (Linnaeus)

Four specimens: Swan River, Riding Mountain, Birch Island.

1951: At Otter Falls two noted on June 21 and three on July 12. One at Sprague, July 15. One near Overflowing River, August 1. *1921:* One collected at Birch Island, Lake Winnipegosis, and another noted there

on August 4. *1938:* Observed on July 1 (1), 2 (1), 20 (1) in Riding Mountain. *1937:* Not uncommon at Swan River. At Duck Mountain, one seen on August 7 was the only observation.

Eastern Belted Kingfisher. *Megaceryle alcyon alcyon* (Linnaeus)

Four specimens: Swan River, Garland, Duck Mountain, Fairford.

Observed about water near Rennie, Whitemouth, West Hawk Lake (nesting 10 miles west), Big Whiteshell Lake, Emerson, Sprague, Overflowing River, Reindeer Island, Fairford, Swan River, Garland, Duck Mountain, The Pas, Dauphin, Riding Mountain, Cormorant Lake, and Thicket Portage (two or three almost daily).

Northern Flicker. *Colaptes auratus luteus* Bangs

Nineteen specimens: Dauphin, Whitemouth, Overflowing River, Duck Mountain, The Pas, Swan River, Herchmer, Cormorant Lake, Bird, Ilford, Riding Mountain.

Fairly common to common about Whitemouth (breeding), Sprague, Dauphin (breeding), Swan River (breeding), Reader and Halcrow lakes, Cormorant Lake, Moose and Cedar lakes, Thicket Portage, Ilford, Bird. At Herchmer noted only occasionally, but a nest was located. Scarce in Riding Mountain (breeding) and Duck Mountain. At Garland it was not common but was seen regularly.

Recently the writer has become increasingly skeptical of the validity of *C. a. borealis* Ridgway. Of the specimens listed above only ten are adults. Wings of six adult males measure (in mm.) 153-162·5 (av., 157·8; of four adult females, 153-161·5 (156·4). Thus the series is closer to *luteus,* but there is much individual variation, and the specimens from northernmost localities are not the largest. Rand (1944) advocated discontinuing the use of the name *borealis* altogether. If the race is valid, it probably is confined to the Northwest.

Hybrid Flicker. *Calaptes auratus* subsp. x *C. cafer* subsp.

One specimen: The Pas.

An adult male taken at Halcrow Lake, near The Pas, on June 15, 1937, has much red in the malar region, but no other indication of mixed ancestry is apparent.

Northern Pileated Woodpecker. *Dryocopus copus pileatus abieticola* (Bangs)

One specimen: Riding Mountain.

1951: Near Otter Falls two were seen on June 21 and two also 9 miles west of Rennie on June 23. There was much evidence on trees of the presence of this woodpecker in the Whiteshell Forest north of Rennie and at Falcon Lake. At Overflowing River a deserted nest cavity was noted, and there was other evidence of this bird there. *1921:* Taverner saw several on Duck Mountain, July 28 and 29. *1938:* An adult male collected in Riding Mountain (Clear Lake) on July 12. *1936:* One noted by Randall on August 10 at Thicket Portage where excavations of this species were seen in trees. Clarke (MS.) noted it "fairly regularly" in the Moose and Cedar Lakes area.

Eastern Red-headed Woodpecker. *Melanerpes erythrocephalus erythrocephalus* (Linnaeus)

Two specimens: Five miles east of Sprague.

In *1951,* two pairs were seen 5 miles east of Sprague on July 15, and two thought to be a pair were collected there on July 16. Unfortunately, one was too badly damaged to be sexed. Measurements (in mm.) of one adult male: wing, 141; tail, 76·1; culmen from base, 29·0. The other unsexed, but apparently a female, measures: wing, 138; tail, 72; culmen from base, 29·0. They are decidedly intermediate but slightly nearer the nominate race.

The species was noted in *1951* also at Emerson, May 29 (1); Winnipeg Beach, May 31 (1 in nesting cavity); Elma, June 12 (1); Oak Bank, June 22 (1); near Seven Sisters dam, July 6 (1), August 9 (1); near Beausejour, August 8 (1). In *1938,* Taverner's party saw a nesting pair at Dauphin. Except at Sprague, the birds were too close to human dwellings to permit the taking of specimens. It appears probable, however, that birds from western Manitoba may be nearer *caurinus,* but no specimens from that part of the province are available.

Yellow-bellied Sapsucker. *Sphyrapicus varius varius* (Linnaeus)

Ten specimens: Swan River, Rennie, Riding Mountain, Thicket Portage.

1951: Locally fairly common, particularly in the large aspens of Whiteshell Forest where eight were seen on June 20. A nest with young on July 11 at Otter Falls. Not observed at Overflowing River, but drillings in the bark of trees indicated its occurrence. *1938:* Rare at Dauphin, where only one was seen (June 17). Resident but not common in Riding Mountain. *1937:* Several pairs at Swan River. Two nests noted. *1936:* Quite common at Thicket Portage where two parents and two young were taken establishing its breeding. Clarke (MS.) found it common about Moose and Cedar Lakes.

Northern Hairy Woodpecker. *Dendrocopos villosus septentrionalis* (Nuttall)

Twenty-four specimens: Whitemouth, Overflowing River, Turtle Mountain, Peonan Point, Duck Mountain, Garland, Cormorant Lake, Swan River, Riding Mountain, The Pas, Thicket Portage, Selkirk, Long Point.

1951: Noted in the Whitemouth area on June 19 (1), July 3 (2), 5 (1), 6 (1), 12 (1); at Sprague, July 16 (3); Overflowing River, July 22 (1), 24 (1), 26 (3), 27 (1), August 1 (5), 2 (1), 3 (1). *1938:* At Dauphin, June 3 (1). Not common at Riding Mountain. *1937:* Uncommon at Swan River, Garland, Duck Mountain, and The Pas. *1936:* Fairly common at Cormorant Lake and Thicket Portage. Only two seen at Bird and one at Herchmer. Clarke (MS.) found a nest at Moose Lake on June 9, *1929.* The only specimen available from extreme southeastern Manitoba is an immature male, July 12. Its wing measurement is 127 mm.

Nelson Downy Woodpecker. *Dendrocopos pubescens nelsoni* (Oberholser)

Twelve specimens: Otter Falls, Fairford, Overflowing River, Riding Mountain, Dauphin, Cormorant Lake, Swan River, Garland, Duck Mountain, The Pas.

1951: One noted on July 5 at Whitemouth and three at Otter Falls on July 11. I am at a loss to account for the apparent rareness of this species in that area. One at Riding Mountain (Clear Lake) on July 18, and observed also near Overflowing River on August 1 (1), 2 (2). *1921:* Taverner noted it at Virden, Peonan Point, Fairford and Fairford River, Pine River, Duck Mountain, Moose Lake, Saskatchewan River from Cedar Lake to The Pas, and Lake Winnipeg north to Reindeer Island. *1938:* Resident but not common at Dauphin and Riding Mountain. *1937:* Several nesting pairs at Swan River. Not common at Garland and Duck Mountain. At The Pas a breeding pair noted on June 20 and two adults noted on June 5. *1936:* One noted on September 2, and six at Cormorant Lake. At Thicket Portage singles were seen three times. A series of adults from Shoal Lake have wing measurements (in mm.) as follows: 5 males, 92–98 (av 95·1); three females, 95-97 (96·3); thus they are decidedly intermediate. Birds from the extreme southeastern corner of Manitoba may be closer to *medianus*, but adult specimens are lacking.

Arctic Three-toed Woodpecker. *Picoïdes arcticus* (Swainson)

Seven specimens: Otter Falls, Thicket Portage, Bird.

In *1951* it was noted a few miles east of Otter Falls on June 21 (2), July 7 (1), 12 (4). In *1936* it was noted uncommonly at Thicket Portage, Ilford, and Bird.

American Three-toed Woodpecker. *Picoïdes tridactylus bacatus* Bangs

Eight specimens: Overflowing River, Riding Mountain, Thicket Portage, Ilford, Bird, Cormorant Lake.

1951: An adult male collected on July 26 near Overflowing River. *1938:* An adult male on July 21 in Riding Mountain. *1936:* One taken at Cormorant Lake, September 6. At Ilford an adult male and a juvenal taken on July 25. At Bird an adult female and young male just out of nest collected on July 12. The July specimen from Riding Mountain tends slightly toward *fasciatus* but seems nearer *bacatus*. The others are definitely *bacatus*.

Eastern Kingbird. *Tyrannus tyrannus* (Linnaeus)

Seventeen specimens: Whitemouth, Rennie, Swan River, Riding Mountain, Dauphin, Garland, Thicket Portage, The Pas, Overflowing River.

1951: Observed in daily numbers from three to fourteen in the Whitemouth region, a nest (four eggs) at Beausejour, June 22. Common at Sprague. In the Overflowing River area it was seen in daily numbers from two to sixteen, and family groups were noted. *1921:* Taverner found it common north to Birch Island and Hecla Island. *1938:* Locally fairly common at Dauphin; not plentiful in Riding Mountain. *1937:* Very common

at Swan River and Garland; scarce in Duck Mountain; fairly common near The Pas. *1936:* Several groups at Thicket Portage where last seen on August 25. One observed at Cormorant Lake on September 2.

Arkansas Kingbird. *Tyrannus verticalis* Say

In *1951*, noted at Whitemouth on June 8 (1), 10 (1), 20 (1), July 2 (1); at Elma, June 15 (1); Hazelridge, June 22 (1); near Seven Sisters dam, July 1 (2), 7 (2), 11 (1), 12 (1); and at Lac du Bonnet, June 15 (1).

Northern Crested Flycatcher. *Myiarchus crinitus boreus* Bangs

Five specimens: Otter Falls, Dauphin, Fairford, Riding Mountain.

1951: Noted almost daily near Whitemouth but not more than four in a day. *1938:* Rare at Dauphin where two were taken. In Riding Mountain two pairs were located. *1937:* In Duck Mountain singles were noted on August 20 and 26.

Eastern Phoebe. *Sayornis phoebe* (Latham)

Eleven specimens: Rennie, Overflowing River, The Pas, Dauphin, Riding Mountain, Thicket Portage, Swan River, Duck Mountain, Bird.

1951: Noted regularly (not more than three in a day) near Whitemouth, Rennie, and Sprague. Nesting at Rennie and La Rivière. One near Overflowing River on July 24. *1921:* Taverner noted only two, one in Duck Mountain, July 28, and one in Riding Mountain, August 17. *1938:* A pair at Dauphin; two pairs in Riding Mountain. *1937:* Common near Swan River; several at Garland; resident in Duck Mountain; rather uncommon but nesting at The Pas. *1936:* Several family groups at Thicket Portage. Last seen August 27. Several pairs and a nest at Bird. At Herchmer, one was seen on several occasions but could not be collected.

Yellow-bellied Flycatcher. *Empidonax flaviventris* (Baird and Baird)

Nine specimens: Julius, Overflowing River, Duck Mountain, Garland, Ilford.

1951: Observed near Rennie, June 13 (1), 27 (1), Julius, June 16 (1), July 3 (3), 5 (1), 11 (1); near Whitemouth, June 18 (2); Otter Falls, June 21 (1); Sprague, July 15 (1), 16 (2); near Mafeking, July 25 (1), Overflowing River, July 28 (2). *1921:* At Duck Mountain, July 29 (6). *1937:* Uncommon resident at Garland and Duck Mountain. *1936:* Observed a number of times at Ilford, Bird, and Herchmer.

Traill Flycatcher. *Empidonax traillii traillii* (Audubon)

Fifteen specimens: Dauphin, Riding Mountain, Swan River, The Pas, Bird, Whitemouth, Rennie, Overflowing River.

Locally distributed about Whitemouth, Emerson, Sprague, Overflowing River, Swan River, Garland, Duck Mountain, Dauphin, Riding Mountain, and The Pas. Farther north it was found quite common at Thicket Portage, scarce at Ilford. It was heard repeatedly at Bird.

Least Flycatcher. *Empidonax minimus* (Baird and Baird)

Nineteen specimens: Garland, Dauphin, Riding Mountain, Thicket Portage, The Pas, Swan River, Whitemouth, Rennie, Overflowing River.

Common in the Whitemouth-Rennie area and in various numbers at Dauphin, Riding Mountain, Swan River, Garland, Overflowing River, and The Pas. At Cormorant Lake several were seen and at Thicket Portage one or two daily. A short-tailed juvenal female was taken at Thicket Portage on August 23, *1936*, which indicates breeding there.

Eastern Wood Pewee. *Contopus virens* (Linnaeus)

Three specimens: Sixteen miles west of Whitemouth.

In *1951*, it was observed almost daily in the Whitemouth-Rennie area, but no more than seven were seen in any one day. The song in all cases was typical of eastern populations. The three specimens are certainly referable to *virens,* as also are two June-July adults examined from Shoal Lake. One of the last was laying. The Shoal Lake birds seem to show no intergradation toward *richardsonii,* thus supporting the specific difference between *richardsonii* and *virens.*

Western Wood Pewee. *Contopus richardsonii richardsonii* (Swainson)

Eight specimens: Dauphin, Riding Mountain, Red Deer River (4 miles south, Overflowing River (11 miles south).

1951: Red Deer River mouth (4 miles south), July 25 (5); and at points between 11 and 14 miles south of Overflowing River mouth it was noted on August 1 (1), 2 (2), 3 (1). All singing heard was typical of *richardsonii. 1938* and *1937:* No notes were made on song by these parties, and as confusion with other species is obvious in their field notes, only data derived from specimens taken are presented here. These are an adult male and an adult female from Riding Mountain, July 15 and 16, and an adult male from Dauphin, June 8, all *1938.* There is an adult male from Swan River, July 10, *1937.*

Olive-sided Flycatcher. *Nuttallornis borealis* (Swainson)

Thirteen specimens: Garland, Duck Mountain, The Pas, Thicket Portage, Ilford, Bird.

1951: In the Whitemouth–Rennie and Overflowing River areas it was an uncommon resident of the spruce bogs, but not more than three were noted in a day. *1921:* Noted in Duck Mountain, north end of Moose Lake, and in Riding Mountain. *1938:* One noted in Riding Mountain. *1937:* Not uncommon at Garland where breeding as attested by a short-tailed juvenal taken August 2. Fairly common in Duck Mountain and near The Pas. *1936:* Uncommon at Thicket Portage and Ilford. Three juvenals not long out of nest collected at Thicket Portage, August 8 and 10. At Bird, singles were noted July 5, 7, and 8, one of which was collected.

Hoyt Horned Lark. *Eremophila alpestris hoyti* (Bishop)

Four specimens: Cormorant Lake.

At Cormorant Lake, Horned Larks appeared on September 8, *1936*, became common on September 9 and 10, but were not seen after September 12. Four were taken which are referable to *hoyti.*

Saskatchewan Horned Lark. *Eremophila alpestris enthymia* (Oberholser)

Twenty-two specimens: Whitemouth, Dauphin, Swan River.

1951: Rather common in open fields in the Whitemouth area, but no more than ten were seen in a day. *1938:* At Dauphin, June 3 to 24, it was uncommon but breeding. *1937:* At Swan River, June 23 to July 20, a fairly common breeder, showing preference for newly broken land. Seven adults and two juvenals taken. At Garland, July 23 to August 4, several small flocks were seen in flight, but apparently they were non-resident.

Specimens of breeding birds from across southern Manitoba are rather uniform, being darker and greyer than *leucolaema* from southwestern Saskatchewan and Alberta. Horned Larks from southern Manitoba have been considered by many to be *praticola,* but they are less ochraceous and are somewhat paler than *praticola.* The writer has not examined any actual topotypes of *enthymia,* but two April specimens taken 2 miles north of Saskatoon, not far from the type locality (St. Louis), are at hand. They are greyer than *leucolaema* and are similar to birds from southern Manitoba, except that the Saskatoon specimens are slightly paler. Judging by the comments of Snyder (1938), *enthymia* breeds east at least to the Rainy River region of Ontario.

Tree Swallow. *Iridoprocne bicolor* (Vieillot)

Four specimens: Dauphin, Swan River, The Pas.

1951: Noted in daily numbers from two to fourteen in the Whitemouth–Rennie area. First flying young on July 4. Observed also at Emerson, July 14 (6) and Sprague July 15 (7), and near Overflowing River, July 17 (10), 25 (10). *1938:* Uncommon but breeding at Dauphin where a nest with four eggs was seen on June 7. Rare in Riding Mountain where two were noted. *1937:* Fairly common at Swan River (nesting), Garland, and The Pas. *1936:* Not common at Thicket Portage, probably due to lateness of season. Common and breeding at Ilford. At Bird two to six were seen on most days. Noted occasionally at Herchmer.

Bank Swallow. *Riparia riparia riparia* (Linnaeus)

Ten specimens: Dauphin, Swan River, Herchmer.

1951: About forty breeding at Whitemouth and two at Telford. Noted also at Sprague, July 15 (26) and 16 (3). *1938:* About sixty breeding at Dauphin. *1937:* Breeding (about one hundred and twenty) near Swan River. Several pairs seen at Garland. *1936:* One or two on July 20, 22, and 24 at Ilford. Not common but breeding at Bird. Uncommon but breeding at Herchmer.

Barn Swallow. *Hirundo rustica erythrogaster* Boddaert

Five specimens: Dauphin, Riding Mountain, Swan River, Overflowing River, Whitemouth.

1951: Common and breeding in the Whitemouth–Rennie area where noted in daily numbers from three to twenty-one. At Sprague observed on July 15 (40), 16 (19). At The Pas it was seen on July 19 (7). Nesting near

Overflowing River and noted about most small shacks along the road between there and The Pas. It was noted in daily numbers of four to nineteen. *1938:* Breeding at Dauphin and Riding Mountain. *1937:* Common at Swan River and Garland. At The Pas it was found scarce when one and four respectively were noted on two occasions.

Northern Cliff Swallow. *Petrochelidon pyrrhonota pyrrhonota* (Vieillot)

Seven specimens: Whitemouth (7 miles east), Rennie (7 miles west).

In *1951,* a breeding colony of about eighty individuals was noted 7 miles west of Rennie. This swallow was observed also in small numbers about Whitemouth, Seven Sisters dam, and Sprague. In *1936,* Taverner's party noted 'occasional groups' at Bird and saw "a number" of nests at Gillam. His 1937 and 1938 parties failed to record it. No specimens have been examined from northern or western parts of the province.

Purple Martin. *Progne subis subis* (Linnaeus)

Eleven specimens: Dauphin, Riding Mountain, Swan River, Garland, Austin.

1951: Common and breeding at Whitemouth. At Sprague it was seen on July 15 (8) and 16 (28). Two noted along Red Deer River on July 25. *1938:* Uncommon at Dauphin where nesting in flicker excavations in trees and telegraph poles. Nesting in trees and bird boxes in Riding Mountain. *1937:* Not uncommon nesting in trees at Swan River and Garland. At Duck Mountain one was seen on August 19. *1936:* Six observed at The Pas on June 19 and 20.

Eastern Canada Jay. *Perisoreus canadensis canadensis* (Linnaeus)

Alberta Canada Jay. *Perisoreus canadensis albescens* Peters

Fourteen specimens: Julius, Otter Falls, Riding Mountain, The Pas, Bird, Herchmer.

1951: Three family groups noted in June and July near Julius. Two family groups near Otter Falls on July 11 and August 9. At Sprague, three immatures observed on July 16. It was fairly common about Overflowing River, adults and immatures, as many as twelve noted in a day. *1938:* Resident in Riding Mountain. *1937:* At Garland one was seen on July 26. It was common at Duck Mountain and The Pas. *1936:* Common at Cormorant Lake, Thicket Portage, Ilford, Bird, and Herchmer.

One adult from Riding Mountain and one from The Pas, while somewhat intermediate, seem obviously closer to *albescens.* Specimens from Herchmer and Bird belong to the nominate race. Three worn adults and one in partial post-juvenal plumage from Julius and Otter Falls, respectively, are almost exactly intermediate between the two races.

Northern Blue Jay. *Cyanocitta cristata bromia* Oberholser

Fourteen specimens: Julius, Overflowing River, Dauphin, Riding Mountain, Swan River, Garland, Duck Mountain.

1951: Not uncommon in the Whitemouth area, nesting at Lac du Bonnet and Otter Falls. Observed at Sprague, July 15 (1) and 16 (4).

Observed on several dates between Mafeking and a point 11 miles south of Overflowing River. *1938:* Uncommon at Dauphin and Riding Mountain. *1937:* Uncommon at Swan River and Garland where juvenals were taken. Scarce at Duck Mountain and The Pas. *1936:* Singles noted at Thicket Portage on August 1 and 6. Clarke (MS.) observed one on August 29, *1929*, at Portage Bay, Cross Lake.

American Magpie. *Pica pica hudsonia* (Sabine)

Two were observed by the writer at Minitonas on July 19, *1951*.

Northern Raven. *Corvus corax principalis* Ridgway

Two specimens: Mouth of Overflowing River (8 miles south).

1951: Observed near Rennie on June 2 (1), 9 (3), 13 (1), 23 (2); Big Whiteshell Lake, June 20 (1); West Hawk Lake, June 26 (1); Julius, July 6 (3); Otter Falls, July 7 (1). Although Taverner's parties did not observe it at The Pas, we saw three on several July dates 5 miles south of there. Between Red Deer River and The Pas it was noted on July 19 (2), 20 (2), 21 (5), 23 (13), 24 (3), 25 (9), 26 (5), 27 (3), 28 (2), 30 (5), August 1 (9), 2 (7), 3 (8). Those included many birds of the year. *1936:* At Thicket Portage several were seen at different times in August.

Western Crow. *Corvus brachyrhynchos hesperis* Ridgway

Ten specimens: Swan River, Dauphin, Whitemouth, Overflowing River, The Pas, Bird.

More or less common at all collecting stations south of The Pas. About The Pas and farther north about Cormorant Lake, Thicket Portage, and Ilford it was moderately common. At Bird, a few were seen on most days, and a young bird just out of the nest was caught and banded. At Herchmer it was seen only occasionally, but an occupied nest was found.

Long-tailed Black-capped Chickadee. *Parus atricapillus septentrionalis* Harris

Eastern Black-capped Chickadee. *Parus atricapillus atricapillus* Linnaeus

Twenty-four specimens: Julius, Big Whiteshell Lake, Swan River, Dauphin, Riding Mountain, Overflowing River, Birch Island, The Pas, Thicket Portage.

1951: At Julius and Big Whiteshell Lake it was noted on but eight dates, not more than five in a day. One at Sprague on July 15. Observed almost daily (1-7) near Overflowing River. *1921:* Taverner recorded it at Austin, Peonan Point, Fairford, Selkirk, Pine River, Birch Island, Saskatchewan River delta, and on Lake Winnipeg at Bull Head and Reindeer Island. *1938:* Scarce but breeding at Dauphin; breeding also in Riding Mountain. *1937:* Common at Swan River, Garland, and Duck Mountain. Uncommon but breeding near The Pas. *1936:* Small bands noted daily at Cormorant Lake. Fairly common and breeding at Thicket Portage.

Specimens from localities west of Shoal Lake are surely *septentrionalis*, as also is an adult male from Thicket Portage, August 16 (wing, 70; tail, 69 mm.). Specimens from Shoal Lake incline in size and colour somewhat

toward *atricapillus* but are a little nearer *septentrionalis*. Three juvenals and an adult from Julius and a worn adult and a juvenal from Big Whiteshell Lake, while far from typical, seem nearer *atricapillus*. A male from Stony Mountain, near Winnipeg, taken October 3, 1935, also is closer to *atricapillus*.

Hudsonian Boreal Chickadee. *Parus hudsonicus hudsonicus* Forster
Alberta Boreal Chickadee. *Parus hudsonicus farleyi* Godfrey

Sixteen specimens: Julius, Otter Falls, Riding Mountain, Duck Mountain, Overflowing River, The Pas, Thicket Portage, Ilford.

1951: Observed at Otter Falls, June 21 (1), July 12 (12); Falcon Lake, June 26 (1); Julius, July 3 (5), 6 (3); Sprague, July 16 (1); Overflowing River area, July 22 (2), 23 (4), 24 (3), 25 (6), 26 (6), 27 (4), 28 (3), August 1 (4), 2 (1). *1938:* Adults and young seen and collected in Riding Mountain. *1937:* Common in Duck Mountain. Only four observed at The Pas. *1936:* Common at Cormorant Lake and Thicket Portage. Rather uncommon but breeding at Ilford. Specimens from Riding and Duck Mountains, Overflowing River, and The Pas, while not quite typical, are closer to *farleyi*. The others are referred to *hudsonicus*.

White-breasted Nuthatch. *Sitta carolinensis cookei* Oberholser

Seven specimens: Selkirk, Swan River, Riding Mountain.

1921: Singles heard in Turtle Mountain. A few seemed to be nesting at Selkirk on July 24, and on August 24 two immatures were taken. *1938:* Uncommonly noted in Riding Mountain. *1937:* Several individuals observed, and on June 29 a family group was seen at Swan River. Observed twice at Garland.

Red-breasted Nuthatch. *Sitta canadensis* Linnaeus

Five specimens: Rennie, Otter Falls, Beausejour, Selkirk, The Pas.

1951: Locally not uncommon at Julius and Rennie. Commoner in Whiteshell Forest where twelve were seen on July 7. One was taken south of Beausejour on June 22 in aspen-oak woodland, apparently several miles from any conifers. Noted in small numbers almost daily near Overflowing River. *1921:* One at St. Laurent, Riding Mountain, and Reindeer Island. About twenty-five at Selkirk on August 23.

Brown Creeper. *Certhia familiaris americana* Bonaparte

Seven specimens: Otter Falls, Overflowing River, High Portage.

1951: One noted near Big Whiteshell Lake on June 20; and on July 7 a family group of six east of Otter Falls. Two were noted 10 miles south of The Pas on July 23 and one at Overflowing River on July 26. *1921:* Taverner collected one at High Portage, Lake Winnipegosis, on August 2.

Western House Wren. *Troglodytes aëdon parkmanii* Audubon

Seventeen specimens: Whitemouth, Dauphin, Riding Mountain, Swan River, Duck Mountain, The Pas.

1951: Observed almost daily, no more than five in a day in the Whitemouth area and east to Ontario; noted also at Emerson and Sprague. One at Overflowing River July 26. *1938:* Uncommon at Dauphin. Nest with eight eggs on June 15. Scarce in Riding Mountain but nested. *1937:* Common at Swan River and Garland. Scarce in Duck Mountain. Uncommon about The Pas but more common in the vicinity of the town.

Eastern Winter Wren. *Troglodytes troglodytes hiemalis* Vieillot

One specimen: Otter Falls.

1951: Singles were noted at Otter Falls, July 12; Overflowing River, July 26, 27, and August 1. *1921:* One seen at Long Point, Lake Winnipegosis, August 3. *1937:* One seen at Halcrow Lake, near The Pas, on June 20.

Prairie Marsh Wren. *Telmatodytes palustris iliacus* Ridgway

Seven specimens: Whitemouth, Sprague, Great Falls, Riding Mountain.

1951: Observed near Whitemouth, June 24 (5), 27 (2), July 4 (14, one carrying food); Sprague, July 15 (1), 16 (4); Great Falls, June 15 (5), 19 (3). *1921:* Noted at Clandeboye Bay, St. Laurent, Peonan Point, Grahamdale, Fairford, Lake St. Martin, Pine River. *1938:* Resident but uncommon in South Lake marsh, Riding Mountain. The Riding Mountain specimens were not examined in the present connection.

Short-billed Marsh Wren. *Cistothorus platensis stellaris* (Naumann)

Nineteen specimens: Whitemouth, Elma, Rennie, Overflowing River, Peonan Point, Garland, Riding Mountain, The Pas.

1951: Locally common near Whitemouth, Rennie, Elma, and Sprague. Somewhat less common about Overflowing River where we saw it on July 21 (2), 22 (1), 25 (3), 30 (2). *1921:* Noted at St. Laurent, Oak Point, Peonan Point, Grahamdale, and Fairford. *1937:* Three seen at Swan River on July 9. Fairly common at Garland. Noted but twice in Duck Mountain, but this may be due to lateness of season. Very common at Reader Lake near The Pas.

Catbird. *Dumetella carolinensis* (Linnaeus)

Eleven specimens: Dauphin, Garland, Swan River, Riding Mountain, Whitemouth, Overflowing River.

1951: Regularly observed in small numbers about Whitemouth, Rennie, and Sprague. At the mouth of Overflowing River two were observed on July 22, and one was collected 3 miles farther south on July 26. *1921:* Taverner found it common through the southern parts of his itinerary and noted it north to Peonan Point, Fairford, Pine River. *1938:* Common about Dauphin. Uncommon, occurring about settlements, in Riding Mountain. *1937:* Common at Swan River and Garland.

Western Brown Thrasher. *Toxostoma rufum longicauda* (Baird)

Four specimens: Dauphin, Riding Mountain.

1951: The species was sparingly distributed about Elma, Great Falls, Beausejour, and Sprague, but as no specimens were secured from these

more eastern localities the racial status of these is unknown. *1921:* Noted north to Grahamdale and St. Laurent. *1938:* Uncommon at Dauphin and at Clear Lake, Riding Mountain. Birds from eastern Manitoba may prove referable to *rufum*, but none was available for examination.

Eastern American Robin. *Turdus migratorius migratorius* Linnaeus

Twenty-three specimens: Whitemouth, Overflowing River, Riding Mountain, Dauphin, Garland, Swan River, The Pas, Ilford, Bird, Herchmer.

1951: Common breeder between Beausejour and the Ontario boundary and south to Sprague. Common also about Overflowing River. *1938:* Not uncommon at Dauphin and Riding Mountain. *1937:* Common at Swan River, Garland, and The Pas, but uncommon in Duck Mountain. *1936:* Common at Thicket Portage, Ilford, and Bird (where nesting); fairly common at Herchmer.

Eastern Hermit Thrush. *Hylocichla guttata faxoni* Bangs and Penard

Fifteen specimens: Whitemouth, Riding Mountain, Overflowing River, Duck Mountain, The Pas, Cormorant Lake, Thicket Portage.

1951: Fairly common in the Whitemouth-Rennie area. Noted less frequently about Overflowing River, but this may be due mainly to seasonal decrease in singing. *1938:* Uncommon in Riding Mountain. *1937:* Only one heard at Swan River and two observed at Garland. Resident in Duck Mountain where two immatures were taken. Common near The Pas. *1936:* Common first week in September at Cormorant Lake. Common at Thicket Portage, Ilford, and Bird. Less common at Herchmer where a singing male was taken on June 27.

Olive-backed Thrush. *Hylocichla ustulata swainsoni* (Tschudi)

Seven specimens: Seven Sisters dam, The Pas, Duck Mountain, Thicket Portage, Skunk Bay.

1951: Common and breeding about Whitemouth, Rennie, Sprague, Overflowing River, and The Pas. *1937:* Noted only once in Duck Mountain and The Pas. *1936:* At Cormorant Lake the only record was of one found dead on September 5. At Thicket Portage, although the species was said to be rare, juvenals were taken indicating breeding. Clarke (MS.) found it 'abundant' in the Moose and Cedar Lakes area.

Gray-checked Thrush. *Hylocichla minima minima* (Lafresnaye)

Four specimens: Cormorant Lake, Herchmer.

1936: Common migrant at Cormorant Lake in early September. At Herchmer this was the commonest thrush, and two sets of four eggs and one set of three eggs, were taken on June 27. Another set of three eggs was collected on July 1.

Willow Thrush. *Hylocichla fuscescens salicicola* Ridgway

Twelve specimens: Whitemouth, Swan River, Dauphin.

1951: Noted daily (1 to 18) about Whitemouth, Rennie, and Sprague. 1938: Scarce at Dauphin. A nest there on June 18 contained one egg of

this thrush and five of the cowbird. *1937:* Abundant at Swan River where breeding. Apparently rare at Garland where only two or three singles were noted.

Eastern Bluebird. *Sialia sialis sialis* (Linnaeus)

Ten specimens: McMunn, Garland, Riding Mountain.

1951: Singles noted at McMunn and Whitemouth on June 18. Near Sprague four were seen on July 15, and two on July 16. One was noted at Piney on July 17. *1921:* Four on August 17 at Riding Mountain. *1938:* Two adults and six young on July 25 and 27 at Octopus Lake, Riding Mountain. At Dauphin a female on June 8 was the only record.

Mountain Bluebird. *Sialia currucoides* (Bechstein)

Eight specimens: Garland, Spruce Woods Forest Reserve.

1921: A nesting pair in the Spruce Woods Forest Reserve, where two adults and three nestlings were collected on July 6. *1937:* A nesting pair with "two fully-fledged young" at Garland on July 27. Clarke (MS.) saw a roughly stuffed skin in the store at Moose Lake. It apparently was shot near Little Angling Lake.

Eastern Golden-crowned Kinglet. *Regulus satrapa satrapa* Lichtenstein

Five specimens: Julius, Overflowing River, Duck Mountain.

1951: At Overflowing River, July 28 (5); Julius, August 7 (8); near Seven Sisters dam, August 9 (5). These appeared to be family groups. *1937:* Resident in Duck Mountain. At The Pas two singles and a pair were the only ones met with. Clarke (MS.) called it "regular" in the Spruce and Cedar Lakes area.

Eastern Ruby-crowned Kinglet. *Regulus calendula calendula* (Linnaeus)

Nine specimens: Julius, Dauphin, Duck Mountain, The Pas, Cormorant Lake.

1951: At Julius two adults observed on June 16. An adult accompanied by three short-tailed juvenals on July 3 also at Julius, undoubtedly a breeding record. Three observed near Seven Sisters dam on August 9. At Overflowing River one was seen on July 23 and three on July 26. *1938:* Only one pair observed at Dauphin. *1937:* A not common resident at Duck Mountain. Not uncommon at The Pas. *1936:* Common at Cormorant Lake; fairly common at Thicket Portage and Ilford; a few seen at Bird and Herchmer.

American Pipit. *Anthus spinoletta rubescens* (Tunstall)

One specimen: Cormorant Lake.

1938: A common migrant during first week of September. Clarke (MS.) noted it along Moose Lake on September 14, *1929.*

Sprague Pipit. *Anthus spragueii* (Audubon)

Five specimens: Dauphin, Riding Mountain, Garland, The Pas.

1951: A single near Emerson on July 14. *1921:* Noted near Clandeboye Bay and St. Laurent. *1938:* Locally fairly well represented at Dauphin,

as many as three singing males heard at one time. A pair noted at Octopus Lake, Riding Mountain, on July 25. *1937:* Locally not uncommon at Swan River. At Garland a specimen in juvenal plumage, taken on July 29, was the only record. Three were noted on June 16 near Halcrow Lake, The Pas.

Bohemian Waxwing. *Bombycilla garrula pallidiceps* Reichenow

Five specimens: Thicket Portage.

1936: Three stub-tailed juvenals were collected at Thicket Portage on August 10; another juvenal and an adult male were taken on the following day. Five more birds were seen on August 18. The young obviously were not long out of the nest and were hatched in the vicinity without doubt.

Cedar Waxwing. *Bombycilla cedrorum* Veillot

Twenty-one specimens: Whitemouth, Beausejour, Riding Mountain, Swan River, Garland, Overflowing River, The Pas, Cormorant Lake, Thicket Portage.

1951: Noted daily (2 to 12) about Whitemouth, Rennie, Sprague, and Overflowing River. Nests noted at Whitemouth and Beausejour. *1938:* Noted in small flocks at Dauphin and Riding Mountain. *1937:* Noted regularly in small numbers at Swan River; scarcer at Garland. Scarce in Duck Mountain. Locally common at The Pas. *1936:* Rather uncommon at Cormorant Lake. Common throughout August at Thicket Portage.

Northern Shrike. *Lanius excubitor borealis* Vieillot

One specimen: York Factory.

1936: At Bird a shrike of this species was seen in flight hotly pursued by a robin. *1949:* An adult female taken at York Factory on July 28 by N. Neufeld is referable to *borealis*.

White-rumped Shrike. *Lanius ludovicianus excubitorides* Swainson

Six specimens: Dauphin, Swan River, Garland.

1951: Not noted east of Hazelridge and Oakbank where singles were seen on June 22. On July 19 one was noted 5 miles south of Birch River, north of Swan River. *1921:* A pair with young were seen near Clandeboye Bay, and the species was observed at St. Laurent, Selkirk, and Dauphin. *1938:* Observed only twice at Dauphin. *1937:* Not common at Swan River, but several nesting pairs were located and adults and short-tailed juvenals were collected. About Garland it was well distributed.

Specimens from extreme southeastern Manitoba may be referable to *migrans*, but none was examined. Birds from as far east as Shoal Lake seem closer to *excubitorides*, however.

Starling. *Sturnus vulgaris vulgaris* Linnaeus

1951: Observed in daily numbers between one and forty-one about Whitemouth and Sprague. Breeding at both places.

Yellow-throated Vireo. *Vireo flavifrons* Vieillot

1951: Two were seen at Emerson on May 29, our only observations.

Blue-headed Vireo. *Vireo solitarius solitarius* (Wilson)

Eleven specimens: Whitemouth, Rennie, Julius, Overflowing River, Duck Mountain, Cormorant Lake, Thicket Portage.

1951: Observed in small numbers (maximum seven in one day) at Julius, Whitemouth, and Rennie. About Overflowing River only one was seen (July 28). *1921:* Several, including apparently a family group, in Duck Mountain, July 29. *1937:* Recorded twice in Duck Mountain. *1936:* Only one noted at Cormorant Lake (September 3). At Thicket Portage five were seen on August 19, two of which were collected.

Red-eyed Vireo. *Vireo olivaceus* (Linnaeus)

Twenty-one specimens: Whitemouth, Overflowing River, Hartney, Dauphin, Riding Mountain, Swan River, Duck Mountain, The Pas, Thicket Portage.

1951: Common and breeding about Whitemouth, Rennie, Sprague, and Overflowing River. *1938:* Abundant resident at Dauphin; less common in Riding Mountain. *1937:* Common at Swan River, Garland, Duck Mountain, The Pas. *1936:* Not uncommon migrant at Cormorant Lake September 2 and 3, were last noted on September 11 (1). Common at Thicket Portage.

Philadelphia Vireo. *Vireo philadelphicus* (Cassin)

Eight specimens: Riding Mountain, Swan River, Reader Lake, Thicket Portage.

1951: Noted only near Whitemouth where a single was seen on July 4 and 9. *1937:* Taken at four well-distributed points at Swan River. At The Pas the only record was of a male collected on June 7. *1936:* At Thicket Portage it was noted at irregular intervals during August but not seen after August 24.

Eastern Warbling Vireo. *Vireo gilvus gilvus* (Vieillot)

Six specimens: Whitemouth, Dauphin.

1951: Breeds locally in small numbers about Whitemouth (young out of nest, August 9) and noted at Sprague on July 15 (2). *1921:* Taverner found it common in all suitable localities he visited north to Peonan Point and Fairford. *1938:* Common breeder at Dauphin where a nest was located on June 15 (male singing while incubating eggs).

Black and White Warbler. *Mniotilta varia* (Linnaeus)

Sixteen specimens: Julius, Rennie, Dauphin, Riding Mountain, Garland, Duck Mountain, The Pas, Thicket Portage.

1951: Noted regularly in small numbers about Otter Falls, Julius, Rennie, and near Overflowing River. Young accompanying adults at Overflowing River on July 21. *1938:* Singing males heard and seen at Dauphin several times in June. Resident but not common in Riding Mountain. *1937:* Uncommon at Swan River, Garland, Duck Mountain, but fairly common at The Pas. *1936:* Common throughout August at Thicket Portage.

Immatures taken August 5 and 6 are in post-juvenal dress and may well have been raised there. One bird was noted at Cormorant Lake on September 1. *1929:* Clarke recorded it as common in the Moose and Cedar Lake area.

Tennessee Warbler. *Vermivora peregrina* (Wilson)

Twenty-six specimens: Julius, Overflowing River, Riding Mountain, Garland, The Pas, Long Point, Fairford, Duck Mountain, Cormorant Lake, Thicket Portage, Bird, Oxford House.

1951: Observed in the Julius–Whitemouth–Rennie area on June 5 (1), 8 (1), 16 (1), 18 (2), 20 (1), 21 (1), 28 (2), 30 (2), July 3 (3), 5 (2), 6 (2), 9 (3), 10 (2); in the Overflowing River area, July 20 (2), 23 (5), 24 (2), 27 (1); August 3 (1), 7 (1). *1921:* One taken at Fairford, July 20. Fairly common at northern end of Lake Winnipegosis, the lower Saskatchewan River, Riding Mountain, and several points on Lake Winnipeg north to Little Bull Head. *1938:* Resident in Riding Mountain. *1937:* Noted at Garland on several occasions. In Duck Mountain common during first part of August but scarce after August 15. Moderately common at The Pas. *1936:* At Cormorant Lake five were noted on September 5. Common at Thicket Portage until August 24. Not uncommon at Bird where an adult male and female were taken on July 9. *1949:* An adult male taken at Oxford House on July 5 by N. Neufeld.

Orange-crowned Warbler. *Vermivora celata celata* (Say)

Eleven specimens: Duck Mountain, Riding Mountain, Thicket Portage, Ilford, Bird, Herchmer.

1938: Although no mention of this species is made in the field notes of the party, I find an immature female in the collection taken at Clear Lake, Riding Mountain, August 3. *1937:* Common in first half of August in Duck Mountain where adults with young were seen on August 7 and 12. Fairly common at The Pas. *1936:* Six at Cormorant Lake, September 12. Common until August 25 at Thicket Portage. Fairly common at Ilford where two nestlings were taken on July 29. At Bird one was noted on July 5 and two on July 7, and at Herchmer two on June 23 and six on June 27.

Nashville Warbler. *Vermivora ruficapilla ruficapilla* (Wilson)

Ten specimens: Julius, Whitemouth, Darwin, Rennie, Duck Mountain, The Pas.

1951: Observed in the Julius–Whitemouth–Rennie area in daily numbers between one and twelve. Young just out of nest on June 29. Seen at Sprague, July 16 (2). *1937:* Adults feeding well-fledged young in Duck Mountain on August 19. At Harrow Lake, near The Pas, a single male was collected on June 5. *1929:* Clarke noted that this species was 'regular' in the Moose and Cedar Lakes area.

Northern Parula Warbler. *Parula americana pusilla* (Wilson)

1951: The writer saw a singing male on June 5 in mixedwood forest about 9 miles west of Rennie.

Northern Yellow Warbler. *Dendroica petechia amnicola* Batchelder
Eastern Yellow Warbler. *Dendroica petechia aestiva* (Gmelin)

Fifteen specimens: Rennie, Riding Mountain, Dauphin, Swan River, Birch Island, Overflowing River, The Pas, Thicket Portage, Bird.

1951: In the Whitemouth–Rennie area it was observed on June 2 (4), 4 (2), 5 (2), 8 (1), 9(1), 10 (3), 11 (2), 15 (5), 17 (1), 18 (2), 19 (2), 20 (3), 21 (1), 22 (3), 25 (2), 26 (1); July 2 (3), 5 (4), 7 (1), 9 (1), 10 (1), 12 (1); at Sprague, July 15 (7), 16 (2); at The Pas, July 19 (1), at Overflowing River, August 1 (1). At Delta on August 6 it was very common. *1921:* Taverner found it common almost everywhere in his itinerary except Duck Mountain, where it was not noted. *1938:* Common locally at Dauphin. Not noted in Riding Mountain until August 9 when one was taken and another was seen on August 12. *1937:* At Swan River it was scarce in the wooded areas but was seen regularly about the town. Uncommon at The Pas where two males were taken on June 10. *1936:* One seen on September 2 was the only record. Quite common at Thicket Portage until August 25. Locally fairly common at Bird. At Herchmer one was occasionally heard, and one nest was located. *1929:* Clarke found it common in the Moose and Cedar Lakes area.

D. p. amnicola is the breeding bird of the northern parts of the province intergrading with *aestiva* at Dauphin and Shoal Lake. A single adult female from Rennie is very close to *aestiva*.

Magnolia Warbler. *Dendroica magnolia* (Wilson)

Fifteen specimens: Duck Mountain, Overflowing River, The Pas, Cormorant Lake, Thicket Portage.

1951: Noted mainly in the Whiteshell Forest and a few miles west of Rennie on June 2 (1), 5 (2), 13 (4), 21 (5), 23 (4), 26 (1), July 5 (2), 12 (4); at Sprague, July 16 (1); near Overflowing River, July 21 (1), 23 (2), 26 (5), 27 (2), 28 (1). *1921:* Common in Duck Mountain, July 28 and 29; a single at Skunk Point, northern Lake Winnipegosis, August 4, and another at Bull Head, Lake Winnipeg, August 24. *1938:* One pair observed in Riding Mountain. *1937:* Scarce in Duck Mountain where an adult male on August 10 and a post-juvenal female on August 16 were taken. *1936:* At Cormorant Lake a post-juvenal male on September 2 and a post-juvenal female on September 5 were taken. At Thicket Portage it was uncommon "except on August 19 and 23 when quite a few were seen." A juvenal just out of the nest was taken on August 12, definitely a breeding record. *1929:* Clarke found it common in the Moose and Cedar Lakes area.

Cape May Warbler. *Dendroica tigrina* (Gmelin)

Seven specimens: Duck Mountain, Moose Lake, Thicket Portage.

1951: Noted only in a black spruce bog near Julius where two were seen by the writer on June 16 and one on July 9. *1921:* Three observed at the north narrows of Moose Lake on August 10, of which two were collected. *1937:* Three individuals recorded, of which one was taken on

August 12. *1936:* At Thicket Portage one was collected on August 13, and on August 18 ten were seen and two taken. *1929:* Clarke saw singles at Moose Lake on June 4 and 9.

Eastern Myrtle Warbler. *Dendroica coronata coronata* (Linnaeus)

Eighteen specimens: Julius, Riding Mountain, Spruce Forest Reserve, Bull Head, Reindeer Island, Duck Mountain, The Pas, Thicket Portage, Herchmer.

1951: Observed near Julius on June 6 (1), 28 (2), 30 (1), July 3 (3), 6 (2), 9 (3—one adult carrying food), 10 (3); Lac du Bonnet, June 19 (1); Otter Falls, June 21 (1), July 12 (2); Big Whiteshell Lake, July 5 (2); at Sprague, July 16 (7), 17 (5); Overflowing River area, July 23 (6), 24 (2), 25 (4), 26 (18), 27 (8), 28 (4), 30 (6), August 1 (4). *1921:* Two in Spruce Forest Reserve, July 6, and noted at many more northern points. *1938:* Resident but rare in Riding Mountain. *1937:* Common, adults feeding young several times noted. At The Pas, one taken on June 8 is the only one noted. *1936:* Common first week in September at Cormorant Lake. At Thicket Portage it was common through August. At Ilford two or three were seen each day. At Bird not uncommon but not seen every day. At Herchmer several were seen on June 22 and 24. Single adults were collected on both dates.

Black-throated Green Warbler. *Dendroica virens virens* (Gmelin)

Eight specimens: Julius, Otter Falls, Duck Mountain, Moose Lake.

1951: Near Julius two were seen on June 6 and one on July 9. On July 12 two were seen at Otter Falls. *1937:* Resident in Duck Mountain where adults were seen feeding young. *1921:* At the North Narrows of Moose Lake two were collected on August 10. *1929:* Clarke referred to it as "regular" in the Moose and Cedar Lakes area.

Blackburnian Warbler. *Dendroica fusca* (Müller)

Eighteen specimens: Rennie, Julius, Riding Mountain, Duck Mountain, Overflowing River, The Pas, Red Point, and Moose Lake.

1951: Observed in the Julius–Rennie area on June 4 (1), 5 (3), 8 (1), 13 (5), 16 (3), 20 (1), 21 (3), 23 (5), 26 (3), 28 (1), 30 (1), July 3 (4), 5 (3), 7 (1), 12 (2); near Overflowing River adults were accompanied by juvenals on July 21 and 26, and one juvenal just out of the nest was taken on the latter date. *1921:* About twenty noted at Long Point on August 3, and the species was seen also at Moose Lake on August 11; Riding Mountain, August 17; Red Point, August 4; and Moose Lake, August 11. *1938:* Resident in Riding Mountain where singing was heard until July 15. *1937:* Several noted daily in Duck Mountain between August 9 and 17, where adults were seen feeding young. It was fairly common at The Pas between June 2 and 20.

Chestnut-sided Warbler. *Dendroica pensylvanica* (Linnaeus)

Eight specimens: Rennie, Riding Mountain, Swan River, The Pas.

1951: Observed almost daily in the Whitemouth-Rennie area in numbers from one to six per day. *1921:* Three noted in Riding Mountain on

August 18. *1938:* Resident in Riding Mountain where males ceased singing by July 15. *1937:* At Swan River an adult male was collected on July 13. One noted at Duck Mountain on August 7. At Reader Lake, near The Pas, two were seen on June 5 and three on June 8.

Bay-breasted Warbler. *Dendroica castanea* (Wilson)

Eight specimens: Riding Mountain, Duck Mountain, The Pas, Oxford House.

1921: Three seen in Duck Mountain, July 29. *1938:* Resident in Riding Mountain and was heard singing until July 15. *1937:* Rare in Duck Mountain where two post-juvenal females were taken on August 7. *1929:* Clarke saw this species at the north end of Moose Lake on June 6 and at Burrows Narrows on June 9. *1949:* An adult male was collected at Oxford House by N. Neufeld on July 5.

Black-polled Warbler. *Dendroica striata* (Forster)

Eight specimens: The Pas, Thicket Portage, Ilford, Herchmer.

1951: Near Overflowing River one was seen on July 21. *1921:* Eight noted at Skunk Bay on August 3 and four on Reindeer Island on August 26. *1937:* At The Pas several were seen June 17 to 20, and two males were taken. *1936:* At Cormorant Lake migrants were noted on September 3 (1) and 8 (4). Of spotty occurrence at Thicket Portage, August 13 to 16. A family group of an adult female and three juvenals was taken August 13, the adult of which was still feeding the young. It was rather uncommon at Ilford. At Bird and Herchmer it was the commonest warbler. A set of four eggs was collected at Herchmer on June 28.

Northern Pine Warbler. *Dendroica pinus pinus* (Wilson)

Four specimens: Julius.

1951: Observed regularly about Julius in daily numbers between one and five. Noted also near Rennie, June 13 (1); Big Whiteshell Lake, June 20 (2); and South Junction, west of Sprague, July 17 (2).

Western Palm Warbler. *Dendroica palmarum palmarum* (Gmelin)

Twenty-nine specimens: Duck Mountain, Big Whitefish Lake, Overflowing River, The Pas, Cormorant Lake, Thicket Portage, Ilford, Bird.

1951: One observed near Otter Falls on July 7. On August 7 near Julius nine were seen, although the species was not observed there in the breeding season. About Overflowing River it was observed in daily numbers between three and twenty-six. Apparently the species was migrating on August 2 when the largest number was seen. *1921:* Six seen at Big Whitefish Lake on August 15. *1937:* Common in Duck Mountain, August 6 to 27. Fairly common near The Pas, June 17 to 20. *1936:* At Cormorant Lake migrants were common in first week of September, but none was seen after September 14. The commonest warbler at Thicket Portage where several adults and juvenals were taken. A few seen daily at Ilford.

64201—16

Fairly common at Bird where a nest and five eggs were examined. Only two were seen at Herchmer (June 22). Clarke found it 'regular' in the Moose-Cedar Lakes region.

Oven-bird. *Seiurus aurocapillus aurocapillus* (Linnaeus)

Thirteen specimens: Julius, Rennie, Dauphin, Riding Mountain, Duck Mountain, The Pas.

1951: Noted daily in the country between Julius and Rennie where it was seen in daily numbers between two and fifteen. About Overflowing River we recorded it only on July 20 (2) and 21 (1). *1921:* Noted in Spruce Woods Forest Reserve, Carberry, Fairford, and Reindeer Island. *1938:* At least one pair located at Dauphin. In Riding Mountain the species was heard frequently but was not often seen. *1937:* Several heard at Swan River. At Garland a bird heard on July 24 was the only record. Noted only once in Duck Mountain. Near The Pas it was noted daily at Halcrow Lake but on only one day at Reader Lake. *1929:* Clarke found it common in the Moose and Cedar Lakes area.

Grinnell Water-thrush. *Seiurus noveboracensis notabilis* Ridgway

Sixteen specimens: Riding Mountain, Swan River, Garland, Duck Mountain, Overflowing River, Cormorant Lake, Thicket Portage, Herchmer.

1951: Observed near St. George, on Winnipeg River, June 15 (1); near Big Whiteshell Lake, June 20 (2); near Rennie, June 25 (1); one at Falcon Lake and one at Telford, June 26. At Overflowing River three were seen on July 26. *1921:* One seen at Dauphin, July 26; two in Riding Mountain, August 18; one at Selkirk, August 23 and one on Reindeer Island, August 26. *1938:* A specimen taken in Riding Mountain on August 10 and 11, but the species was not recorded earlier that season. *1937:* Uncommon at Swan River where one was taken on June 30. Rare at Garland where immatures were noted on August 4 and one taken. In Duck Mountain it was noted in singles and pairs almost daily between August 14 to 23. *1936:* At Cormorant Lake six were seen on September 3. At Thicket Portage it was rather uncommon. At Ilford "a few seen every day or so but not at all common." At Bird two were seen on July 9 and two more on July 12. At Herchmer it was locally not uncommon.

Connecticut Warbler. *Oporornis agilis* (Wilson)

Nine specimens: Julius, Overflowing River, Riding Mountain, Duck Mountain, The Pas.

1951: Observed near Rennie, June 2 (1); West Hawk Lake, June 5 (1); Whitemouth, June 8 (2); Lac du Bonnet, June 19 (1); Otter Falls, June 21 (1); Julius, June 4 (3), 6 (3), 9 (1), 16 (1), 28 (1), July 3 (1); Sprague, July 15 (1), 16 (1); Overflowing River, July 26 (1, actions of which suggested presence of young); August 1 (1); *1938:* Uncommon on Riding Mountain where an adult female and a juvenal just able to fly were taken on July 7, obviously a breeding record. *1937:* In Duck Mountain one was

collected on August 14 and another seen on August 19. At Halcrow Lake, near The Pas, this species was observed on June 17 to 20. An adult male was taken on the latest date.

Mourning Warbler. *Oporornis philadelphia* (Wilson)

Twenty specimens: Julius, Great Falls, Turtle Mountain, Fairford, Austin, Dauphin, Riding Mountain, Swan River, Garland, Duck Mountain, The Pas.

1951: Observed mainly between Julius and Rennie on June 5 (1), 8 (3), 9 (2), 13 (1), 15 (2), 16 (1), 19 (2), 20 (2), 21 (2), 23 (3), 26 (2), 27 (3), July 3 (8), 4 (1), 5 (6), 6 (1), 7 (4, including flying young), 9 (1), 11 (9), 12 (8); near Sprague, July 16 (2); in the Overflowing River area, July 22 (2), 23 (4), 24 (5), 25 (12), 26 (11), 27 (7), 28 (3), 30 (3), August 1 (2), 2 (1). *1921:* Single adult males taken at Turtle Mountain, August 1; Fairford, July 20; and Austin, July 7. *1938:* Uncommon resident at Dauphin but more numerous about Clear Lake, Riding Mountain. *1937:* Uncommon at Swan River, Garland, and Duck Mountain, although specimens were taken at those three localities. At The Pas it was fairly common, and one or two were seen every day.

Northern Plains Yellow-throat. *Geothlypis trichas campicola* Behle and Aldrich

Thirty-four specimens: Riding Mountain, Dauphin, Swan River, Garland, Duck Mountain, Overflowing River, The Pas, Cedar Lake, Cormorant Lake.

1951: Noted in daily numbers between one and nine near Overflowing River. *1921:* Common in suitable localities throughout Taverner's itinerary, except about Lake Winnipegosis, where, probably fortuitously, it was not noted. *1938:* Fairly common resident at Dauphin and in Riding Mountain. *1937:* Abundant resident at Swan River. Common at Garland, Duck Mountain, and The Pas. Adults feeding young at Garland. *1936:* One was collected at Cormorant Lake on September 3.

Yellow-throat. *Geothlypis trichas* subsp.

Ten specimens: Elma, Whitemouth, Rennie.

1951: Observed each day in numbers of from two to fourteen a day in the Julius–Whitemouth–Rennie areas. Near Sprague it was seen on July 15 (12), 16 (10).

Specimens from southeastern Manitoba are intermediate between *campicola* and *'brachidactyla'*. They may be referable to *minnesoticola*, a race proposed recently by Oberholser (1948), but the writer has been able to examine no topotypical material.

Wilson Warbler. *Wilsonia pusilla pusilla* (Wilson)

Six specimens: Riding Mountain, The Pas, Cormorant Lake, Ilford, Bird, Herchmer.

1921: Between August 13 and 23 singles were seen at Cedar Lake, Riding Mountain, and Selkirk. *1937:* A male taken on June 7 was the only record at The Pas. *1936:* One taken at Cormorant Lake on September 2 was the only observation. At Thicket Portage it was seen in small numbers until August 23 but not later. At Ilford it was noted commonly for three days, July 20 to 22, but was not found again until July 30 (2). At Bird it was common in alder thickets, and at Herchmer it was, next to the Black-poll, the commonest warbler.

Canada Warbler. *Wilsonia canadensis* (Linnaeus)

Four specimens: High Portage, The Pas, Overflowing River.

1951: An adult male noted at Otter Falls and an immature female taken at Overflowing River were our only observations. *1921:* Two at High Portage on August 2 and 3. *1937:* An adult male on August 19 was the only observation in Duck Mountain. It was fairly common at The Pas. *1929:* Clarke said it was abundant in the Moose and Cedar Lakes area.

Northern American Redstart. *Setophaga ruticilla tricolora* (Müller)

Fourteen specimens: Riding Mountain, Dauphin, Duck Mountain, High Portage, Garland, Swan River, Cormorant Lake, Thicket Portage.

1951: Locally not uncommon in the Whiteshell Forest Reserve where, near West Hawk Lake, it was seen on June 5 (4); Brereton Lake, June 20 (2); Rainbow Falls, July 5 (2); and near Otter Falls, July 11 (8), 12 (5). Singles at Julius, Whitemouth, and Rennie were our only other observations. *1921:* First seen at Fairford, July 20. Apparently a family group at Selkirk, July 24. More or less common along Lakes Winnipeg and Winnipegosis and in Riding Mountain. *1938:* Rare at Dauphin where two males on July 6 were the only records. Not quite so scarce in Riding Mountain where three males were taken. *1937:* Uncommon in Duck Mountain. Uncommon but regularly noted at Garland. At Swan River it was recorded daily as common. *1936:* Single specimens, one at Thicket Portage on August 6 and one at Cormorant Lake on September 3, were taken. No others observed. *1929:* Clarke saw a few in the Moose and Cedar Lakes area.

English Sparrow. *Passer domesticus domesticus* (Linnaeus)

1951: More or less common about all settlements visited north to The Pas. *1936:* Common at Cormorant Lake. At Thicket Portage, Taverner was told that this species had nested for several years. Farther north, at Mile 214, Hudson Bay Railroad, Taverner saw about ten at a coal shed on July 30. *1929:* Clarke noted it at The Pas and at Moose Lake Post in unrecorded numbers.

Bobolink. *Dolichonyx oryzivorus* (Linnaeus)

Ten specimens: Elma, Dauphin, Riding Mountain, Swan River, Garland.

1951: Noted in small numbers in grassy meadows about Rennie, Whitemouth, Seven Sisters dam, Elma, Reynolds, and Sprague. *1921:* Taverner found it common on his trip through southern Manitoba north to St. Laurent. He noted a single at Peonan Point, one near the mouth of Fairford River, and several at Shoal Lake. *1938:* Three pairs resident near Octopus Lake, Riding Mountain. At Dauphin two males and a female were seen on June 15, and on June 17, three singing males were present. *1937:* Four males were seen at Swan River on June 24, and females were seen on later dates. At Garland a small colony of about four pairs was present.

Western Meadowlark *Sturnella neglecta neglecta* Audubon

Nine specimens: Whitemouth, Dauphin, Swan River, Garland.

1951: Observed daily (2 to 16 a day) in suitable habitat about Whitemouth, Rennie, and east to Ontario. Common at Sprague. *1921:* Common north to Dauphin. *1938:* Common on the prairie sections about Dauphin. *1937:* Rather scarce at Swan River but fairly common at Garland, considering the restricted habitat available.

Yellow-headed Blackbird. *Xanthocephalus xanthocephalus* (Bonaparte)

1951: The writer saw an adult male in a marsh north of Whitemouth on June 24. It was not seen on any later visit to this marsh, however. Fifteen were seen at La Rivière on July 18. *1938:* A single male observed at Dauphin on June 20. *1937:* Taverner was told that this species occurs at the lower end of Reader Lake, near The Pas, but was unable to check that assertion. Clarke noted it as "abundant in the big marsh" in his Cedar and Moose Lakes trip.

Giant Red-wing. *Agelaius phoeniceus arctolegus* Oberholser

Forty-two specimens: Whitemouth, Overflowing River, Dauphin, Riding Mountain, Swan River, Garland, Duck Mountain, The Pas, Thicket Portage.

1951: Common in suitable habitat about Whitemouth, Rennie, Sprague, and Overflowing River. *1938:* At Dauphin a colony of six pairs was found. A nest on June 20 held five eggs. Fairly common in marshes of South and Octopus Lakes of Riding Mountain. *1937:* Breeding in numbers governed largely by habitat available at Swan River, Garland, Duck Mountain, and The Pas. *1936:* At Thicket Portage it was seen on August 2 (3), 3 (7), 7 (4). At Cormorant Lake one was noted on September 7.

Baltimore Oriole. *Icterus galbula* (Linnaeus)

Ten specimens: Dauphin, Swan River, Garland, Rennie.

1951: Observed regularly in small numbers about Whitemouth, Rennie, and Sprague. Our northernmost observation was of an adult female on Dawson Bay at the mouth of Red Deer River on July 25. *1921:* Taverner found it common north to Fairford. On Lake Winnipegosis he saw it at Birch Island and Red Deer Point. *1938:* Fairly common at Dauphin but

rare in Riding Mountain where singles were noted only twice. *1937:* Recorded daily at Swan River. Scarce at Garland where a female accompanied by young was seen on July 24 and 29.

Rusty Blackbird. *Euphagus carolinus* (Müller)

Sixteen specimens: Riding Mountain, Garland, Duck Mountain, Reindeer Island, Cormorant Lake, Ilford, Herchmer.

1921: One in Riding Mountain on August 17 and six on Reindeer Island on August 25. *1938:* Adults and young were noted and four specimens taken. *1937:* Two taken from flock of five on August 2 at Garland. In Duck Mountain one was noted on August 16 and one on August 23. *1936:* At Cormorant Lake it was common in September. At Thicket Portage fairly common during first half of August but very scarce in latter half. At Ilford it was common in certain localities, evidently nested. At Bird two on July 15 were the only ones seen. At Herchmer several were noted each day, and a nest was found.

Brewer Blackbird. *Euphagus cyanocephalus* (Wagler)

Thirteen specimens: Rennie, Whitemouth, Dauphin, Riding Mountain, Swan River, Garland.

1951: Observed daily (7 to 35 a day) in the Whitemouth–Rennie area; and at Sprague, July 15 (18), 16 (12). *1921:* Common everywhere on Taverner's itinerary north to Steep Rock. *1938:* Resident about Dauphin. A nest containing two eggs on June 10 was located at the base of a clump of dandelions along the railroad. Adults with young ready to fly on June 20. At Clear Lake, Riding Mountain, a few pairs evidently nested. *1937:* Several colonies about Swan River. Nests found on the ground in willow thickets. Adults and young just out of the nest were taken. It was fairly common at Garland.

Bronzed Grackle. *Quiscalus quiscula versicolor* Vieillot

Twelve specimens: Rennie, Elma, Dauphin, Riding Mountain, Swan River, The Pas, Thicket Portage.

More or less common about Whitemouth, Rennie, Elma, Riding Mountain, Dauphin, Swan River, Garland, Duck Mountain, Overflowing River, The Pas. At Cormorant Lake "good numbers" occurred in September. At Thicket Portage it was fairly common throughout August, and a female was taken on August 26.

Nevada Cowbird. *Molothrus ater artemisiae* Grinnell

Twenty-six specimens: Julius, Dauphin, Riding Mountain, Swan River, Garland, The Pas.

1951: Common at Julius, Whitemouth, Rennie, West Hawk Lake, and Sprague. *1921:* Taverner in his travels found it common to Peonan Point where he saw a flock of fifty. He saw it regularly at Fairford, Lake St. Martin, and Duck Mountain. *1938:* Resident but not common at Dauphin and Riding Mountain. *1937:* Abundant about Swan River.

Scarce at Garland where on July 29 a female Mourning Warbler was seen feeding a young cowbird just out of the nest. Near The Pas a few were seen, and two adult males were collected. *1929:* Clarke noted this species at Cormorant Lake, but his notes do not record the date. Specimens from Julius tend toward the nominate race.

Scarlet Tanager. *Piranga olivacea* (Gmelin)

One specimen: Otter Falls.

1951: Small numbers were noted about Otter Falls, Julius, Rennie, and South Junction.

Rose-breasted Grosbeak. *Pheucticus ludovicianus* (Linnaeus)

Nine specimens: Julius, Rennie, Red Deer River, Swan River, Dauphin, Riding Mountain.

1951: Noted regularly but in small numbers about Julius, Whitemouth, and Rennie. At Sprague one was seen on July 16. Near Red Deer River it was seen on July 25 (2) and near Overflowing River on July 26 (1), 30 (1), August 1 (2), 2 (1). *1921:* Taverner recorded it at Turtle Mountain (1), Carberry (2), St. Laurent (1), and on Hecla Island, Lake Winnipeg, (1). *1938:* Not common in June at Dauphin (2 males collected) and rare in Riding Mountain where only a few were seen. *1937:* Observed regularly at Swan River. In Duck Mountain an adult male seen on August 25 was the only record.

Dickcissel. *Spiza americana* Gmelin

1951: At St. Jean Baptiste on Highway 75 the writer observed a singing adult on July 14.

Evening Grosbeak. *Hesperiphona vespertina vespertina* (Cooper)

Three specimens: Red Deer River, Overflowing River (11 miles south).

1951: Two or three were seen almost daily at our camp on Overflowing River. Three noted at Red Deer River, July 25; three others 11 miles south of Overflowing River on August 1.

Eastern Purple Finch. *Carpodacus purpureus purpureus* (Gmelin)

Five specimens: Julius, Rennie, Darwin, Selkirk.

1951: Observed regularly but in small numbers near Whitemouth, Julius, Rennie, Sprague, and Piney. Breeding at Julius.

Taverner Purple Finch. *Carpodacus purpureus taverneri* Rand

Six specimens: Riding Mountain, Dauphin, Swan River, The Pas.

1938: Only three noted at Dauphin (two collected). In Riding Mountain only two were noted (one collected). *1937:* A male collected on July 2 was the only observation at Swan River. The species was noted four times near The Pas, and an immature male was taken. *1951:* Observed at Overflowing River, July 20 (1), 26 (1), August 1 (1); near Red Deer River bridge, July 25 (4); at The Pas, July 23 (2).

Pine Grosbeak. *Pinicola enucleator* subsp.

1936: At Ilford a single dull-plumaged individual was noted on July 19 and apparently a different one on July 21.

Common Redpoll. *Acanthis flammea flammea* (Linnaeus)

Five specimens: Herchmer.

1936: One at Cormorant Lake on September 11 and several on September 12. At Ilford three were identified in flight on July 20 by Smith. At Bird nine were noted on July 7. At Herchmer it was noted in one's, two's and three's, and a nest, with four eggs and the two adults, was collected on July 11.

Northern Pine Siskin. *Spinus pinus pinus* (Wilson)

Thirteen specimens: Julius, Overflowing River, Fairford, Riding Mountain, The Pas.

1951: Observed daily (2 to 123 a day) at Julius, Whitemouth, Rennie, and Elma; largest numbers at Julius. Twenty-seven were seen at Emerson on July 14 far from conifers. Eighteen were noted at Sprague, July 15, and five on the following day. About Overflowing River it was seen daily (3 to 42 a day). *1921:* Taverner noted it daily in the Spruce Forest Reserve and northward. *1938:* Resident in fair numbers in Riding Mountain. *1937:* Small flocks observed three times at Reader Lake, near The Pas, where a male was taken June 4.

Eastern Goldfinch. *Spinus tristis tristis* (Linnaeus)
Pale Goldfinch. *Spinus tristis pallidus* Mearns

Sixteen specimens: Whitemouth, Beausejour, Riding Mountain, Dauphin, Duck Mountain, Swan River, The Pas.

1951: Noted in daily numbers from two to sixteen about Whitemouth and Beausejour; and seen at Sprague, July 15 (26) and 16 (9). About Overflowing River it was observed on July 21 (2), 25 (12), 26 (5), 27 (3), 30 (4), August 1 (2), 2 (1), 3 (6). Two were seen at The Pas on July 23. *1938:* Rather scarce in Riding Mountain but fairly common at Dauphin, showing a marked preference for the vicinity of water in both these areas. *1937:* Very common at Swan River and Garland. Scarce but resident in Duck Mountain. Near The Pas, one to three were seen daily at Halcrow Lake. *1936:* At Bird, Taverner apparently saw one in flight on July 2. His notes read, "It was close enough to see its bright black and yellow and with its festooned flight and its merry familiar notes it was unmistakable."

Specimens west at least to Shoal Lake are referred to *tristis*. Birds from Riding Mountain, Dauphin, Duck Mountain, Swan River, and The Pas are perhaps nearer *pallidus*, but this needs confirmation by examination of winter plumages not available for this study.

Red Crossbill. *Loxia curvirostra* subsp.

1951: On May 30, seven were closely observed some fourteen miles east of Beausejour in jack pine forest. The area was visited on later dates, but this species was not seen again.

White-winged Crossbill. *Loxia leucoptera leucoptera* Gmelin

1951: At Rennie five were seen on June 2. At Julius it was seen on June 30 (1), July 3 (9 fed all morning in spruces that had been burned on May 24, 1951), 6 (40 to 50), 9 (3). Near Overflowing River it was seen on July 21 (7), 26 (3, including a single male). *1921:* Three were seen at the north narrows of Moose Lake, August 11, by Taverner and Lloyd. Specimens were taken by Lloyd. *1937:* Thirty were seen near The Pas on June 17. *1936:* Smith recorded that "an adult male in bright plumage and one dull bird flew by camp (at Ilford) early in the morning. They were both chattering noisily."

Nevada Savannah Sparrow. *Passerculus sandwichensis nevadensis* Grinnell

Churchill Savannah Sparrow. *Passerculus sandwichensis oblitus* Peters and Griscom

Thirty-two specimens: Whitemouth, Rennie, Elma, Riding Mountain, Dauphin, Duck Mountain, Swan River, Overflowing River, The Pas, Cormorant Lake, Thicket Portage, Ilford, Bird, Herchmer.

More or less common at Whitemouth, Rennie, Elma, Emerson, Sprague, Dauphin, Swan River, Overflowing River, Garland, and The Pas. Less common because of less available habitat in Duck and Riding Mountains. Farther north in *1936* Taverner's party found it a common autumn migrant at Cormorant Lake; common about all the fields and clearings near Thicket Portage; common at Ilford; quite common at Bird, where a brood of young just out of the nest was collected; rather scarce at Herchmer, where, however, a nest with five eggs was collected on July 1. Breeding specimens from Herchmer, Bird, and Ilford are *oblitus*. Breeding birds from as far north as The Pas, Lake St. Martin, Shoal Lake, are closer to *nevadensis*. Specimens from extreme southeastern Manitoba (Whitemouth, Rennie, Elma) are perplexingly intermediate but if anything seem nearer *oblitus*.

Baird Sparrow. *Ammodramus bairdii* (Audubon)

Three specimens: Swan River.

1937: Two small colonies of two pairs and eight pairs, respectively, were located in wheat fields at Swan River.

Le Conte Sparrow. *Passerherbulus caudacutus* (Latham)

Twenty-five specimens: Whitemouth, Julius, Elma, Rennie, Overflowing River, Dauphin, Riding Mountain, Garland, Duck Mountain, The Pas.

1951: Locally common in the Julius, Whitemouth, Elma, and Rennie areas where it was seen daily (2 to 12 a day). Between Sprague and Middleboro it was seen on July 15 (7), 16 (6). Similarly locally common about Overflowing River where daily numbers seen varied between two and thirteen. *1938:* Resident but not common at Dauphin, where a female was taken on June 4 with an egg in the oviduct. Fairly common about South and Octopus Lakes of Riding Mountain. *1937:* Fairly common locally at Garland, Duck Mountain, and The Pas.

Nelson Sparrow. *Ammospiza caudacuta nelsoni* (Allen)

Nine specimens: Whitemouth, Sprague, Riding Mountain, Dauphin, Swan River, Duck Mountain, The Pas.

1951: One collected near Whitemouth on June 27. At Middleboro, east of Sprague, two noted on July 15; at Sprague seven seen on July 16; and on July 17 ten were noted in marshes along the road near Caliento. *1938:* Only one noted at Dauphin, a female collected on June 22. In marshes of South and Octopus Lake, Riding Mountain, a few were resident. Males in song until July 30. *1937:* At Swan River noted once: a singing male collected on July 9. Noted in Duck Mountain where juvenals were seen and one collected on August 9. Near The Pas four were seen, one taken, June 8, at Reader Lake, and a few were seen almost daily at Halcrow Lake. *1936:* Several sparrows thought to be this species were noted at Thicket Portage on August 19, and six likewise not certainly identified, were recorded at Cormorant Lake on September 10.

Western Vesper Sparrow. *Pooecetes gramineus confinis* Baird

Nineteen specimens: Julius, Rennie, Whitemouth, Dauphin, Riding Mountain, Swan River, Garland, The Pas.

1951: Noted in daily small numbers in more open areas about Julius, Whitemouth, and Rennie; at Emerson, July 14 (10); Sprague, July 15 (7), 16 (8). *1938:* Resident at Dauphin where a nest containing two newly-hatched young and an egg of the Cowbird was found on June 13. Rare in Riding Mountain where a single bird was taken on July 25. *1937:* Common resident at Swan River and Garland. Noted only once at The Pas where a male was taken on June 17. *1936:* The party saw what was thought to be this species at Cormorant Lake, Thicket Portage, and Bird, but none was collected and there is some doubt as to the species concerned.

Specimens from Julius, Rennie, and Whitemouth are decidedly intermediate between *confinis* and *gramineus* but are nearer *confinis* in average characters.

Lark Sparrow. *Chondestes grammacus* subsp.

1951: We saw six near Emerson on May 29.

Slate-colored Junco. *Junco hyemalis hyemalis* (Linnaeus)

Twenty-four specimens: Julius, Rennie, Lac du Bonnet, Overflowing River, Fairford, Riding Mountain, Duck Mountain, The Pas, Herchmer, Bird, Thicket Portage.

1951: Observed almost daily (1 to 6 a day) about Julius, Lac du Bonnet, Rennie, and Overflowing River. *1938:* Small numbers resident in Riding Mountain where juvenals were taken. *1937:* Only two noted (July 15) at Swan River. It was abundant in Duck Mountain where many young were noted. Strangely enough it was noted only four times at The Pas. *1936:* Common at Cormorant Lake, Thicket Portage, and Ilford. At Bird it was only fairly common, being met with regularly in small

numbers. At Herchmer it was rather scarce and local, but a few were seen every day, and nests were found. A female taken at Herchmer on June 23 had an egg in the oviduct.

Eastern Tree Sparrow. *Spizella arborea arborea* (Wilson)

Three specimens: Herchmer.

1936: Relatively common at Herchmer. A nest containing five eggs was collected there on June 28. Six seen on August 21 by Randall at Thicket Portage probably were migrants.

Chipping Sparrow. *Spizella passerina passerina⟷arizonae*

Twenty-one specimens: Julius, Rennie, Overflowing River, Duck Mountain, Riding Mountain, The Pas, Ilford, Bird.

Common at Julius, Whitemouth, Rennie, Sprague, Overflowing River, Duck Mountain, The Pas, Cormorant Lake, Thicket Portage, and Ilford. Fairly common at Bird. Scarce at Swan River, Dauphin, and Riding Mountain. Specimens listed above are not typical of either *passerina* or *arizonae*. A detailed study of over-all geographical variation in this species is needed.

Clay-colored Sparrow. *Spizella pallida* (Swainson)

Thirty-one specimens: Whitemouth, Rennie, Elma, Overflowing River, Reindeer Island, Dauphin, Riding Mountain, Duck Mountain, Garland, Swan River, The Pas.

1951: Common at Whitemouth, Rennie, Lac du Bonnet, Sprague. Scarce about Overflowing River where noted only on July 30 (2) and August 3 (1). *1938:* Fairly common at Dauphin and Riding Mountain. *1937:* Very common at Swan River and Garland; fairly common but local near The Pas; and uncommon in Duck Mountain. *1929:* Clarke saw this sparrow on July 2 at Little Angling Lake.

Harris Sparrow. *Zonotrichia querula* (Nuttall)

Eight specimens: Herchmer, Bird.

1936: Common at Herchmer. Fourteen nests were found, of which ten were collected: June 23 (3 eggs), 25 (2 sets containing 3 and 4 eggs, respectively), 26 (4 eggs), 27 (3 sets of 3, 3, and 4 eggs), 28 (2 sets of 3 and 4 eggs). At Bird, breeding pairs were discovered and collected on July 12, 13, and 14, but they were locally distributed and scarce. At Cormorant Lake two were seen on September 5, and the species was "quite common" on September 7, undoubtedly migrants.

Gambel Sparrow. *Zonotrichia leucophrys gambelii* (Nuttall)

Twenty-nine specimens: Ilford, Bird, Herchmer.

1936: With the Harris Sparrow, probably the commonest sparrow at Herchmer where numerous nests were found and eleven sets of eggs were collected. Common also at Bird. At Ilford it was only locally common.

At Thicket Portage, Randall reported several on August 9 and 10. The lack of later migrants at Thicket Portage and Cormorant Lake to mid-September was notable.

This population is intermediate but nearer *gambelii*. Of seventeen adults from Herchmer, seven are nearer *leucophrys* and ten *gambelii;* of six from Bird, two are near *leucophrys*, four *gambelii;* of six from Ilford, two are *leucophrys*, four *gambelii;* at Herchmer, one mated pair was of *leucophrys;* two pairs of *gambelii;* two pairs are mixed, the males being *leucophrys*. Of two mated pairs at Bird, one is *gambelii*, the other pair mixed, the male being *gambelii*. A single mated pair from Ilford is *gambelii*.

White-throated Sparrow. *Zonotrichia albicollis* (Gmelin)

Twenty-six specimens: Lac du Bonnet, Riding Mountain, Dauphin, Duck Mountain, Swan River, The Pas, Overflowing River, Cormorant Lake, Thicket Portage, Ilford, Bird, Herchmer.

1951: Locally not uncommon near Rennie, Whitemouth, Elma, Lac du Bonnet, Julius, and Sprague. Much commoner and more generally distributed near Overflowing River. *1938:* Not common at Dauphin. Generally distributed, common, and breeding in Riding Mountain. *1937:* It was more or less common at Swan River, Garland, Duck Mountain, and The Pas. Near The Pas a set of eggs was collected June 28. *1936:* A pair, probably mated, one of which was collected, at Herchmer June 18. Fairly common at Bird and common at Ilford, Thicket Portage, and Cormorant Lake. Taverner noted that all songs heard at Herchmer, Bird, and Ilford were incomplete and fragmentary. In his 1937 notes he wrote with reference to observations at The Pas, "Not once did we hear its clear Canada-Canada song." Farther south, however, at Overflowing River, we noted the usual song many times in 1951.

Alaska Fox Sparrow. *Passerella iliaca zaboria* Oberholser

Five specimens: Herchmer, Bird, Ilford.

1936: At Herchmer a few were seen daily, and at Bird the species was locally quite numerous. At Ilford it was rather uncommon, but a nest with newly-hatched young was found on July 19. At The Pas seven were seen on September 16, probably migrants.

Lincoln Sparrow. *Melospiza lincolnii lincolnii* (Audubon)

Fifteen specimens: Julius, Duck Mountain, The Pas, Cormorant Lake, Thicket Portage, Ilford, Bird.

1951: In southeastern Manitoba a single male was seen and collected on July 3 at Julius in a black spruce bog. In the same area, two adults on August 7 behaved as though they might have had young. A male was heard in song in a bog north of Whitemouth on July 10, and on July 23 six were noted, one singing, in a bog 15 miles north of Overflowing River. Two were seen there again on July 27. *1921:* On August 24 one was

collected by Lloyd near Hecla Island, Lake Winnipeg, and another seen at Little Bull Head. *1937:* Several were seen in Duck Mountain from August 16 to 21. Near The Pas, two were seen on June 19 and one June 20. *1936:* A male and a female were collected at Bird on July 12. At Ilford it was common in tamarack bogs. At Thicket Portage it was quite common, and during the last week of August it became abundant due apparently to a migration. At Cormorant Lake it was seen commonly every day.

Western Swamp Sparrow. *Melospiza georgiana ericrypta* Oberholser

Twenty-two specimens: Elma, Otter Falls, Overflowing River, Riding Mountain, Dauphin, Duck Mountain, The Pas, Thicket Portage, Ilford, Bird.

1951: Rather common in suitable habitat about Whitemouth, Rennie, Elma, Otter Falls, Sprague, and Overflowing River. *1938:* Resident in small numbers at Dauphin and Riding Mountain. *1937:* Only one pair was noted (June 29) at Swan River; and at Garland only one adult was seen. In Duck Mountain it was locally resident, and adults and immatures were noted. At The Pas it was moderately common, one to a few being seen almost daily. *1936:* Common in autumn migration at Cormorant Lake. It was fairly common at Ilford and Bird. At Herchmer a single was observed on June 27, but no specimen was taken.

Dakota Song Sparrow. *Melospiza melodia juddi* Bishop

Forty-three specimens: Whitemouth, Rennie, Overflowing River, Riding Mountain, Dauphin, Garland, Swan River, The Pas, Cormorant Lake, Thicket Portage, Ilford, Bird, Herchmer.

National Museum parties have found this sparrow more or less common at Whitemouth, Rennie, Sprague, Riding Mountain, Dauphin, Garland, Swan River, Overflowing River, The Pas, Cormorant Lake (in migration), Thicket Portage. At Ilford it was uncommon but was fairly common at Bird farther north. At Herchmer only a few were seen, and their shyness was recorded as remarkable. A set of four eggs was collected at Herchmer on July 28, 1936, and an adult male was taken on June 22, 1936.

Lapland Longspur. *Calcarius lapponicus lapponicus* (Linnaeus)

Seven specimens: Cormorant Lake, Overflowing River (9 miles south).

1951: On a beach 9 miles south of Overflowing River, the writer collected a solitary Lapland Longspur on July 30. Although far south of its normal range at that season, this individual was in apparently good condition, being a fat one and a strong flier. *1936:* At Herchmer one was seen on June 22 and 23. As a migrant one was seen at Cormorant Lake on September 7, about ten on the following day, and by September 15 large flocks were well distributed over all the open land about the village. On September 16 there were thousands about the sloughs at The Pas.

Smith Longspur. *Calcarius pictus* (Swainson)

1936: At Cormorant Lake, Randall saw two on September 8 and four on September 9.

REFERENCES

Lloyd, Hoyes (1922): Some northern records of the Turkey Vulture. Can. Field-Nat., vol. 36, No. 9, pp. 178-179.

Macoun, John, and James M. Macoun (1909): Catalogue of Canadian birds. Dept. of Mines, Geol. Surv. Branch, No. 973, pp. i-viii, 1-761.

Oberholser, Harry C. (1948): Descriptions of new races of *Geothlypis trichas*. Pp. 1-4. Published privately by the author at Cleveland, Ohio.

Rand, A. L. (1944): A northern record of the flicker and a note on the cline *Calaptes auratus* cl. *auratus—luteus*. Can. Field-Nat., vol. 58. No. 6, pp. 183-184.

——— (1948): Birds of Southern Alberta. Nat. Mus., Canada, Bull. 111, pp. 1-105.

Snyder, L. L. (1938): A faunal investigation of western Rainy River District, Ontario. Trans. Roy. Can. Inst., vol. 22, Part I, pp. 157-213.

Taverner, P. A. (1927): Some recent Canadian records. The Auk, vol. 44, No. 2, pp. 217-228.

REPORT ON BIOLOGICAL INVESTIGATIONS AT ALERT, N.W.T.

By S. D. MacDonald

INTRODUCTION

A biological study of the area in the vicinity of Alert, Ellesmere Island, N.W.T., was carried out by the writer during the period from April 14 to September 30, 1951. This project extended the biological investigations of the National Museum of Canada north to the shores of the Lincoln Sea, approximately 450 miles from the North Pole.

The primary purpose of this expedition was to obtain specimens for the ornithological and mammalogical collections of the Museum. In addition, 41 lots of marine and fresh-water invertebrates and fish were brought back, as well as 52 sheets of plants prepared for the National Herbarium. A few endo- and ectoparasites were collected. Detailed notes on the wildlife of the area were made; these included such details as numerical status, distribution, and life history. Approximately 150 kodachrome pictures were made, depicting the nature of the area and details of birds, mammals, and plants. In order to record the life colour of the beaks and feet of the birds collected, water-colour sketches were prepared by the writer immediately after specimens had been taken.

The writer was extremely fortunate during his stay at Alert in having Mr. Paul F. Bruggemann, of the Division of Entomology, Department of Agriculture, as companion and colleague. Mr. Bruggemann has prepared a report on his work in entomology and botany. For this reason, the present account contains nothing on these subjects, except a list of plants collected. Sincere thanks are extended to Mr. Bruggemann for his constant interest and assistance in the ornithological and mammalogical work and his invaluable companionship and encouragement on the long and often difficult sledge trips. The writer also wishes to express his thanks to the United States Weather Bureau and the Canadian Meteorological Division, Department of Transport, who made the expedition possible by permitting him to use the Alert Weather Station as a base for field operations. Acknowledgment is gratefully made to the officers and pilots of the United States Air Force and the Royal Canadian Air Force, for their valuable assistance, and also to the men of the meteorological stations at Resolute Bay and Thule. Special thanks are due to Messrs. John Kitzinger and John Lewis, officers-in-charge of Alert Weather Station, for their help and many kindnesses. Personal appreciation is extended to Mr. James Tarver, United States Weather Bureau, for his assistance and pleasant companionship during several collecting expeditions for the larger mammals, expeditions which otherwise would have been impossible without his help.

DESCRIPTION OF THE AREA

Alert is situated in northern Ellesmere Island, on the shore of the Polar Sea, near the most northerly point of land in Canada. The station is named after H.M.S. *Alert*, the flagship of Sir George Nares, who in 1875 com-

manded the *Alert* and the *Discovery* on an expedition which made the greatest single contribution to an accurate survey and exploration of the northern coast of Ellesmere Island.

The station itself overlooks Parr Inlet from above the west side of this small bay, which is about two miles in length. The site is near what is commonly called "The Narrows," where the mouth of Parr Inlet contracts to approximately 75 feet. In the vicinity of the station the country is a rather low, rolling plateau, varying in elevation from approximately 250 to 500 feet, gradually sloping toward the coast, and then more abruptly to the sea.

The highest point of land in the vicinity of the station is Mount Pullen, approximately five miles directly south, rising to 1,650 feet. This is the most prominent landmark in the area and forms the beginning of a chain of elongated hills which extend from west southwest to east northeast.

From the summit of Mount Pullen the northwestern coast of Greenland is visible, with its dark, precipitous cliffs contrasting with the dazzling whiteness of the ice caps. Looking eastward from Mount Pullen towards Black Cape, one has a panoramic view of the gently rolling terrain sloping towards the sea. A series of ancient beach lines may be seen between Black Cape and Mushroom Point. The shores of the many bays and inlets that characterize the rather irregular coastline are covered with water-worn flakes of grey shale and slate. This is interspersed with muddy flats or small deltas, formed during the summer by the slower flowing silt-laden streams. The larger streams, "Sheridan Creek," Ravine Creek, Parr Creek, Hawkins Creek, and Wood Creek, are swelled to violent torrents during the height of the snow melt. These streams are a serious handicap to the traveller who must either walk around them on the sea ice or add miles to his trip by travelling to the headwaters where the streams are not so swift and deep. Wood Creek is the largest of the above-mentioned streams and has its source at the glacier coming down into the head of Wood Creek valley. As the stream flows to the sea, it is fed by myriads of tiny streams running down high valley sides. These terraced valley sides rise several hundred feet above the floor of the valley, and with their well-watered, vegetated, and sheltered ravines probably support more muskoxen and other wildlife than the whole area extending from Black Cape to the head of Hilgard Bay.

Towards the mouth of Wood Creek the valley narrows to form an almost cleft-like ravine. The stream roars between the vertical walls of this gorge, the sides of which are marbled by large wave-like folds in the grey strata. Finally, the pale green water cascades over a 20-foot fall and emerges at the head of its wide and much dissected delta on Black Cliffs Bay.

The rocks here, as in all outcrops examined in the vicinity of Alert, are mostly composed of shale and slate. These strata vary greatly in hardness; the softer ones weather easily into a hard, fast-drying clay. No fossils were found in any of these rocks in the areas visited. Comparatively recent fossils, in the form of large quantities of bivalve shells, were found on top and in the silt or clay slopes about twenty-five to seventy-five feet above sea-level on the south shore of the lower branch of Parr Inlet and Colon Bay.

To the west of Alert Station are the two Dumbell Lakes. These are each approximately one mile in length and with their wet, marshy southern shores provide good feeding habitat for shore birds and others. Beyond these lakes lies Colon Bay, separated from Black Cliffs Bay by the steep, barren promontory Cape Woollen. Hilgard Bay, as well as Black Cliffs Bay, of which it is a continuation, lies at the foot of the plateau rising to the west toward the foothills of the ragged peaks in the United States Range.

Generally speaking, the best habitat for wildlife is found in the vegetated ravines and slopes in the vicinity of Cape Sheridan, Mount Pullen, Ravine Pond, Ravine Bay, the greater part of the southern slopes of Cape Belknap, above Parr Inlet, south shores of the Dumbell Lakes, the area around Hawkins Creek, and finally the extensive Wood Creek valley.

ANNOTATED LIST OF MAMMALS

Generally speaking, mammal populations were small and very localized in the Alert area. Nine species of mammals were recorded in the vicinity by the writer, who is responsible for the following field notes and identifications. Specimens collected have had their determination confirmed by Austin W. Cameron.

Arctic Fox. *Alopex lagopus* (Linnaeus)

The Arctic Foxes, like the long-tailed jaegers, take advantage of the station garbage dump as a source of food. During the winter darkness and until the snow melted in the summer, these friendly little mammals lived under the shelter of a quonset hut in the camp area. The roof of this building, with its sloping sides, was easily accessible and was used frequently as a watch tower.

In spite of the 24-hour daylight period of the summer, the foxes seemed to be more active in the "evening." Several could be seen coming or going to the dump at almost any time. The period of special activity may be explained by the fact that fewer people were about at that time, but the writer does not believe this to be the explanation. Most of the foxes took little notice of human beings and often approached to be fed from the hand.

During the summer period several foxes were seen carrying food from the station, presumably to a den of young. However, no dens were discovered. In their foraging in the dump the foxes carried away a great variety of items. Beef bones which had been sawed in two were found 35 miles away from the station. Jam cans and peanut butter jars were scattered about among the rocks of the hillsides.

In the course of the summer, the foxes become a great nuisance to the collector of small mammals. They learned to follow the writer to the lemming sets, which they dug out and then sprang the Museum special traps to obtain the raisins which were used as bait. If there happened

to be a lemming in the trap, the fox would pick it up, trap and all, and carry it away. In order to have success in the collection of lemmings, the unbaited traps had to be visited every hour, when possible.

It was estimated that from ten to fifteen Arctic foxes visited the station regularly until the middle of June. Among these were two blue-phase individuals, one of which was a very pale chocolate brown. Usually these darker animals were driven away from the food by the whites.

In the early winter, when the grey twilight descended over the tundra, foxes became more frequent visitors to the camp. Then, as the weather became more severe, they took refuge under the quonset hut again for the winter.

Specimens collected:

Two adult ♂, five adult ♀

Measurements (in millimeters):

Males: total length, 881, 810; tail, 327, 278; hind foot, 144, 135.

Females: total length, 821, 845, 805, 807, 797; tail, 309, 310, 265, 290, 267; hind foot, 133, 138, 143, 137, 134.

Arctic Wolf. *Canis lupus arctos* Pocock

This species was never common and was not observed until July 9, although very old tracks were noted in the snow in early spring. In summer, tracks were most common along the shores of the inlets and lakes, where the wolves seemed to run almost a scheduled patrol. Usually they were very wary and made off as soon as they realized that they had been seen. Mr. Bruggemann informed the writer that on September 15 four medium-sized individuals followed him across the ice on the Dumbell Lakes and approached to within about thirty yards. They refused to retreat when shouted at and exhibited extreme interest and curiosity. Their pelage was a dirty, yellowish white.

By following their tracks, we were able to discover where they had killed and eaten an Arctic Fox. It had been completely devoured with the exception of the upper and lower jaws. Most of the wolf scats examined contained fox fur, and in a few, caribou hair was found.

No recent evidence of wolves could be located until July 9, when two animals were observed by Mr. Lewis at Ravine Bay. Approximately one week later, five caribou were observed grazing a few miles from this locality. Since the wolves and caribou appeared in the same area at approximately the same time, where previously no sign of either had been observed, it was seen that the wolves had been moving with the caribou. The remains of the skeleton of an adult male caribou were found near Cape Sheridan. This animal probably died in late autumn or early winter of the previous year. No other carcasses were located.

Observations: July 9 (2), July 19 (1), July 31 (2), August 1 (1), Sept. 15 (4).

Specimen collected:

One adult ♂

Measurements (mm.):

Total length, 1,446; tail, 339; hind foot, 282

Arctic Weasel. *Mustela erminea arctica* (Merriam)

Rare. Observed only once. Tracks were quite common in the rocky ravines in Wood Creek valley.

Specimen collected:

One adult ♂

Measurements (mm.):

Total length, 334; tail, 80; hind foot, 43

Ringed Seal. *Phoca hispida hispida* Schreber

Common in all bays and inlets visited, never observed more than a mile from shore on sea ice. First noted at the edge of a breathing hole on May 31. No young were seen until mid-August.

Observations: May 31 (1), June 28 (2), July 8 (1), July 11 (1), July 12 (1), July 26 (3), July 31 (1), August 11 (7), August 17 (3), August 18 (1), August 22 (16), August 25 (12), August 29 (2), September 2 (2).

Specimens collected:

Three adult ♂, one adult ♀, one juvenile ♀

Measurements (mm):

Males: total length, 1,320, 1,350, 1,425; tail, 115, 154, 165; hind foot, 298, 300, 295

Females: total length, 1,350, 870; tail, 190, 100; hind foot, 314, 243

Of the five stomachs examined, only one contained a few small fish. The remainder contained marine crustaceans. Samples of these were preserved and brought back to the museum.

Bearded Seal. *Erignathus barbatus barbatus* (Erxleben)

Common in all bays and inlets. First noticed on ice at breathing hole on May 19. The writer believes that these holes are made by the ringed seals and enlarged by bearded seals. At least, they both have been observed at the same opening.

Observations: May 19 (3), 31 (2), June 26 (2), July 11 (1), July 13 (1), July 26 (2), July 27 (1), July 30 (1), August 11 (5), August 17 (2), August 18 (1), August 28 (1), September 1 (1).

Specimen collected:

One adult ♀

Measurements (mm.):

Total length, 2,250; tail, 116; hind foot, 422

Collared Lemming. *Dicrostonyx groenlandicus groenlandicus* (Traill)

Scarce and very local in distribution. There was an abundance of dens, but few of them were occupied. On digging up several dens under rocks the writer discovered a number of partially decayed carcasses. These were usually found in an enlarged pocket at the end of the burrow in a natural and curled-up position.

Specimens collected:

Three ♂, ten ♀

Measurements (mm.):

Males: total length, 99, 103, 140; tail, 19, 23, 20; hind foot, 17, 20, 16

Arctic Hare. *Lepus arcticus monstrabilis* Nelson

Scarce; although tracks and droppings were found in the rocky crevices of ravines and hillsides, no hares were observed during the season at Alert.

Peary Caribou. *Rangifer pearyi* Allen

Uncommon. Tracks were very common everywhere on the wet tundra. No animals were seen until July 16, when three females and two young calves were noted grazing in a wet meadow at Hawkins Lake. The calves were at least half grown and were still nursing as the cows moved about. This was also apparent from the still enlarged udders.

Two small herds of bull caribou were seen at Cape Sheridan and at the east side of Mount Pullen.

Observations: July 16 (5), 19 (2), 21 (7).

Specimens collected:

One adult ♂, one adult ♀

Measurements (mm.):

Male: total length, 1,800; tail, 140; hind foot, 481.
Female: total length, 1,550; tail, 144; hind foot, 494.

White-faced Muskox. *Ovibos moschatus wardi* Lydekker

Muskoxen are not common at Alert. Fair-sized herds were seen, but these are very nomadic and seemed to be extremely wary.

The rolling meadows and sheltered ravines in the vicinity of Cape Sheridan and Mann Point support several small herds. These also frequent the grassy slopes along Ravine Bay and Parr Creek Delta. The largest population is located in the well-vegetated areas of Wood Creek valley.

Observations: June 25 at Parr Inlet, two sets of tracks; July 9 (1 male); Parr Creek, July 19 (16, 2 herds of 8 seemed to be mostly female); July 21 (19, 2 herds, 9 and 10) at Mount Pullen, one adult male, seven female, one yearling; three adult male, six female, one calf; August 1 (10) at Ravine Pond, three adult male, four female, three yearlings; August 2 (3) Mount Pullen, one male, two female; August 5 (10) at Mount Pullen, two adult male, five female, three yearlings; August 6 (1) male at Parr Inlet; August 10 (4) at Wood Creek, one male, three female; August 11 (15) at Wood Creek one large male and young calf, remaining individuals smaller than the bull; August 12 (32) at Wood Creek, herd of nine, one large bull, seven smaller animals, one young calf; herd of fourteen, one large bull, nine smaller animals, four yearlings; herd of nine, two adult bulls, four smaller animals, three yearlings; August 13, three adult males at Wood Creek; August 14 (16) at Hilgard Bay, three large bulls, twelve smaller animals and one calf. It should be noted that the identification by sex in the above list is not completely dependable. The writer has had little experience in this regard, and young bulls may have been confused with cows, since none could be definitely identified at that time.

SYSTEMATIC LIST OF BIRDS

During the field season at Alert, twenty-one species of birds were observed; several of these had been previously unrecorded from this extreme northern latitude. Field identifications are by the writer, specimens collected have been examined by W. Earl Godfrey, who is responsible for the identifications. Mr. Godfrey is preparing a paper in which the systematic position of many of these forms will be more fully discussed.

Red-throated Loon. *Gavia stellata* (Pontoppidan)

Breeding in the large, fresh-water ponds on northeastern Ellesmere Island. One nest containing two eggs was found in a small mossy hummock in Ravine Pond. No young of the year were observed.

Observations: June 19 (1), 21 (2), 26 (1), July 2 (2), 3 (1), 4 (1), 7 (1), 9 (1), 10 (2), 11 (2), 12 (2), 13 (1), 18 (1), 21 (2), 23 (5), 25 (2), 26 (5), 31 (3), August 2 (2), 3 (1), 4 (1), 5 (2), 6 (2), 10(4), 22 (2).

Specimens collected:

Four adult ♂, four adult ♀, July 4 to 26

Brant. *Branta bernicla* subsp.

Four flying over Ravine Bay on June 21 was the only observation.

Greater Snow Goose. *Chen hyperborea atlantica* Kennard

Uncommon; breeds on damp, well-vegetated slopes at head of Hilgard Bay. First observed June 13 (7), 25 (1) August 10 (3), one juvenal nearly full-grown.

Specimen collected:

One juvenal male ? nearly full grown.

Old-squaw. *Clangula hyemalis* (Linnaeus)

A rather common breeding duck frequenting the shore leads of the Polar Sea in spring. Feeds on small, well-vegetated ponds and lakes. Only one brood of two young observed; these were at Egerton Lake.

Observations: May 28 (4), June 14 (2), 19 (1), 21 (1), 22 (4), 23 (3), 24 (6), 28 (12), July 21 (35), August 10 (5), 11 (3).

Specimens collected:

Four adult ♂, three adult ♀

King Eider. *Somateria spectabilis* (Linnaeus)

Quite common, but no evidence of breeding was noted.

Observations: June 19 (2), 21 (1), 22 (2), 23 (3), 24 (1), 26 (16), July 4 (11), 6 (10), 7 (10), 9 (11), 10 (19), 11 (25), 12 (19), 13 (14), 16 (30), 18 (25), 19 (12), 21 (30), 24 (10), 26 (4), 27 (3), 28 (18), 30 (1).

Specimens collected:

One adult ♂, four adult ♀

White Gyrfalcon. *Falco rusticolus candicans* Gmelin

Rather rare, and no evidence of breeding.

Observations: May 23 (1), June 10 (1), 25 (3), 26 (6), 27 (6), 28 (1), 29 (1), 30 (1).

Rock Ptarmigan. *Lagopus mutus captus←→saturatus*

Rare in the vicinity of Alert Station, but in Wood Creek valley seemed to be fairly common. No definite evidence of breeding was noted, but "singing" males were heard frequently at Wood Creek.

Observations: April 18 (1), 27 (1), June 8 (2), 9 (5), 10 (2), 11 (3), 12 (6), 13 (7), July 21 (3).

No specimens were taken.

Ringed Plover. *Charadrius hiaticula hiaticula* Linnaeus

Observed only once during the summer. Probably breeds in this area. One adult male with very definite incubation patches was taken at Parr Inlet on July 18. The same day another Ringed Plover was noted in the same locality. It was extremely wary, and the writer believed it to be the mate of the one collected.

Specimen collected:

1 adult ♂

Black-bellied Plover. *Squatarola squatarola* (Linnaeus)

Rare; first observed with a flock of Knots and Red Phalaropes feeding in a small pond on Cape Belknap. Later noted feeding on marshy tundra near Ravine Bay. All individuals were extremely wary.

Observations: June 23 (2), 25 (1), 27 (1).

European Turnstone. *Arenaria interpres interpres* (Linnaeus)

A common breeder. No nests were found, but birds were collected with prominent incubation patches. Fully-fledged young were common during the month of August.

Observations: June 2 (1), 3 (1), 6 (2), 7 (6), 12 (3), 13 (1), 16 (2), 17 (1), 18 (7), 19 (8), 20 (1), 21 (5), 23 (4), 25 (3), 26 (4), 28 (1), July 1 (1), 3 (1), 4 (1), 9 (1), 11 (1), 13 (1), 18 (11), 24 (1), 29 (10), 30 (6), 31 (25), August 1 (18), 3 (14), 4 (26), 5 (38), 10 (17), 11 (8), 12 (7), 13 (2), 18 (1), 22 (8), 28 (1), 31 (1), September 1 (1).

Birds recorded after August 3 are believed to be all birds of the year.

Specimens collected:

Six adult ♂, two adult ♀, and one juvenal ♀

Old World Knot. *Calidris canutus canutus* (Linnaeus)

Common; breeds in the area. The plaintive courtship calls were heard constantly during the first few weeks after their arrival. No nests were located, but the adults seemed to frequent the gravelly slopes which were partly covered with stretches of dryas, saxifrage, and arctic willow. Mr. Bruggemann found a female with at least three newly-hatched downy young on July 26. Fully-fledged young were seen on August 1. In late summer (August), flocks of immature knots, turnstones, and sanderlings could be found almost anywhere along the shores of Parr Inlet and any of the large lakes and ponds. When the ponds began to freeze, these shore birds were observed feeding on the swarms of midges, etc., crawling on the new ice and in the crevices of the old.

Observations: May 31 (1), June 2 (8), 3 (4), 4 (3), 7 (5), 8 (15), 9 (25), 10 (7), 11 (3), 12 (6), 13 (2), 16 (1), 18 (2), 19 (1), 23 (35), 26 (5), 27 (1), July 1 (6), 2 (2), 3 (21), 4 (5), 5 (1), 6 (1), 9 (1), 10 (4), 11 (9), 12 (1), 13 (11), 16 (4), 17 (2), 18 (2), 21 (1), 22 (3), 26 (3), 29 (3), 30 (8), August 1 (7), 2 (24), 4 (2), 5 (18), 10 (22), 11 (2), 12 (1), 17 (4), 22 (3), 25 (7).

Birds observed after August 5 appeared to be all immature.

Specimens collected:

Three adult and one juvenal ♂, two adult and one juvenal ♀, two unsexed downies

Sanderling. *Crocethia alba* (Pallas)

Very rare in June and July. Presumably breeds in area. In August flocks of fully-fledged juveniles frequent the shores of the inlets, ponds, and lakes.

Observations: June 25 (1), July 26 (1), 30 (1), August 1 (3), 4 (7), 5 (5), 10 (40), 13 (1), 17 (13), 18 (2), 22 (2), 24 (28), 27 (1), 29 (1), 30 (1), September 1 (15), 3 (2).

Specimens collected:

One adult and two juvenal ♂, two juvenal ♀

Red Phalarope. *Phalaropus fulicarius* (Linnaeus)

Observed only once at Alert. A flock of ten was observed on a small lake on Cape Belknap on June 23; they were feeding in company with thirty-five knots.

Specimens collected:

Three adult ♂, six adult ♀

Long-tailed Jaeger. *Sterocorarius longicaulus* Vieillot

During the month of June, this was an amazingly abundant species. However, the birds were concentrated in the camp area, where they fed on garbage from the kitchen. They were seldom disturbed and, since there were no dogs at Alert, became very tame. No evidence of nesting could be found. On June 23, about 150 were seen swarming over the garbage dumps. It is an impressive sight to see a flock of these long-winged creatures alight gracefully and softly on the bottle-green water of the shore leads and begin to bathe. This flock disappeared as quickly as it came, and in July and August this species was rarely seen at all.

Observations: May 31 (1?), June 6 (2), 7 (1), 8 (3), 13 (11), 14 (18), 15 (7), 16 (10), 17 (18), 18 (35), 19 (28), 20 (31), 21 (29), 22 (40), 23 (150), 24 (6), 25 (10), 26 (8), 27 (8), 28 (12), 29 (4), July 1 (1), 10 (1), 11 (1), 18 (4), August 5 (1).

Specimens collected:

Three adult ♂, four adult ♀

Glaucous Gull. *Larus hyperboreus hyperboreus* Gunnerus

Uncommon and no evidence of breeding.

Observations: May 23 (1), June 1 (1), 13 (2), 15 (1), 21 (2), 22 (1), 23 (2), 26 (1), 28 (1), July 13 (2), 21 (6), 31 (2), August 3 (1), 4 (1), 10 (5), 17 (1).

No specimens were collected.

Arctic Tern. *Sterna paradisaea* Pontoppidan

Common but not abundant; a few pairs could always be found frequenting the bays and large lakes. Breeds in the area, but only one nest, containing a single egg, was found. This was placed on the bare shingle beach of Ravine Bay. The writer believes that these terns nest, possibly in a small colony, on a tiny island in Black Cliffs Bay, approximately three-quarters of a mile from Wood Creek delta. This island is well vegetated and presumably maintains its luxuriant plant growth through the fertilizing it receives from its summer visitors. Feathers and a few small rounded depressions, some bleached egg shells, and several of the large stones whitened with excrement are evidence of breeding. When Lieutenant Egerton of the Nares expedition visited this island he called it "Oopik Island" on account of the numerous Snowy Owl pellets.

Observations: June 22 (7), 23 (13), 24 (7), 25 (4), 26 (12), 27 (6), July 3 (6), 4 (20), 5 (6), 6 (7), 8 (3), 9 (13), 10 (11), 11 (4), 16 (5), 18 (13), 20 (13), 21 (6), 24 (2), 26 (3), 27 (11), 28 (7), 30 (4), 31 (18), August 1 (9), 2 (17), 3 (5), 4 (9), 5 (11), 18 (17), 22 (19), 25 (18), 28 (5), 30 (5), September 1 (2), 2 (5), 3 (11).

Specimens collected:

4 adult ♂, 1 adult ♀

Dovekie. *Plautus alle alle* (Linnaeus)

Rare; a single adult male was collected on Parr Inlet on August 31. The specimen was noted during a seal hunt as it swam and dived among the ice floes of Parr Inlet. It was rendered flightless by a glancing bullet from a 30·06 rifle, and we were able to observe it swimming several feet below the surface of the water. After diving, the bird seemed to depend completely on its half-opened wings which propelled it swiftly through the water with rowing-like strokes. Its stomach contained small mysid shrimps. This was the only specimen seen at Alert.

Specimen collected:

1 adult ♂

Black Guillemot. *Cepphus grylle ultimus* Salomonsen

Rare; observed only twice at Alert; no evidence of breeding.

Observations: July 25 (4), 30 (1).

Specimen collected:

One adult ♀

Snowy Owl. *Nyctea scandiaca* (Linnaeus)

Observed frequently throughout the season at Alert. No evidence of nesting was found.

Observations: April 24 (1), May 23 (2), June 8 (1), 21 (1), 24 (1), 25 (1), 28 (1), 29 (2), July 1 (2), 2 (3), 3 (2), 4 (3), 8 (1), 9 (1), 11 (1), 21 (1), 22 (2), 24 (1), 25 (1), August 2 (1), 3 (1), 10 (2), 11 (1).

Hornemann Redpoll. *Acanthis hornemanni hornemanni* (Holboell)

Uncommon; seen occasionally from late April to August. Very erratic in behaviour, although not wary. Probably breeds in the area. It seems to prefer the steep, rocky ravines, and in late summer it was seen with Snow Buntings among the rocks and crevices of the bluffs, cliffs, and ravines.

Observations: April 29 (2), May 25 heard (2), May 31 (1), June 11 (1), 12 (2), July 25 (2), August 11 (4), 12 (1), 13 (6).

Specimens collected:

One juvenal ♂, one juvenal ♀, one post-juvenal unsexed.

Eastern Snow Bunting. *Plectrophenax nivalis nivalis* (Linnaeus)

Recorded regularly throughout the season at Alert; breeds there, although no nests were observed. Several were located but were situated in completely inaccessible rocky niches high up in the walls of ravines.

Observations: April 27 (1), May 19 (2), 22 (4), 23 (3), 24 (5), 25 (7), 26 (2), 28 (1), 31 (19), June 1 (1), 2 (1), 3 (6), 4 (2), 6 (2), 7 (13), 8 (30), 9 (50), 10 (27), 11 (20), 12 (30), 13 (9), 14 (2), 15 (6), 16 (2), 17 (2), 18 (3), 19 (2), 20 (2), 21 (6), 22 (4), 23 (1), 25 (1), 26 (3), 27 (2), 28 (1), 29 (1), July 1 (4), 2 (3), 3 (2), 4 (5), 7 (1), 8 (2), 10 (3), 11 (2), 12 (4), 17 (1), 18 (1), 19 (3), 21 (2), 24 (3), 25 (1), 26 (6), 29 (2), 31 (7 family groups), August 1 (1), 2 (4), 3 (2), 10 (11), 11 (4), 13 (1), 24 (1), September 1 (2).

Specimens collected:

Three adult ♂.

LIST OF FISHES

The following identifications and notes were prepared by Mr. Vladimir Walters, Department of Biology, New York University.

Salvelinus alpinus (Linnaeus)—three specimens; field Nos. 23 and 24.

Gymnelis viridis (Fabricius)—one specimen; field No. 22.

Icelid, unidentified—six larvæ (No. 21) and three larger specimens (No. 20). The six larvæ range from 14 to 16 mm. in standard length. The parietal spine is doubled; the dorsal, caudal, and anal fins are continuous; not all elements formed. Fin counts of the larger specimens are as follows: first dorsal, VIII (1), IX (1), X (1); second dorsal (last element not

included), 18 (2), 19 (1); anal (last element not included), 13 (1), 14 (1); pectoral, 16; pelvic, I, 3 (3). The dimensions in mm. for these three large specimens are as follows:

Standard length	37	28	22
Head length	14	10	
Body depth	10	6	
Head depth	8		
Eye width	5	4	
Bony interorbital	1	1	
Caudal peduncle length	7		
Caudal peduncle depth	2	1·5	
Anal papilla length	4·5	0·3	
Pelvic fin length	8	6	
Predorsal length	13	9	
Preanal length	20	13	

The nasal spine is small and sharp, and curves medially. The frontal spine is missing. Parietal spines are two in number, the first low (like a bump) and the second larger but blunt. The first spine bears a cirrus (see below). The preopercular spines are four, the uppermost bifid. A row of thirty-three to thirty-seven bifid spines runs high on the back and ends at the base of the caudal fin. An irregular row of small fleshy spines lies below this row. The lateral line of the largest specimen is armed with toothed bony plates. There are some small scattered spines in the axillary region, below the lateral line. A small spine lies to either side of the anus. The caudal peduncle is armed with two pairs of stout spines ventrally situated. The eyeballs are provided with several rows of warts. Small prickles are present on the interorbital, nape, opercle, and suborbital. The prickles on the forward part of the body merge with the dorsal row of bifid spines (see above).

The head is provided with many large pores. The cirri consist of one large frontal cirrus, trifid in the two larger specimens but simple in the 22-mm. specimen; one simple small parietal cirrus, situated on the first parietal spine; one small simple opercular cirrus; one small simple cirrus on the snout, between the nostril and premaxillary. The lateral line is incomplete, possibly due to the small size of the specimens. The anal palilla is long in the largest specimen and is bent backwards with the two parts of about equal length. The gill membrane is fused, free from isthmus. Pelvic fins are long, reaching to the anal fin even in the 22-mm. individual. The pectoral fins reach beyond the anal fin origin. The depressed first dorsal fin does not reach the region of the second dorsal. The maxillary extends beyond the vertical of the mid-pupil. Vomerine teeth are present, palatine teeth absent.

First three to five (six to seven in largest specimen) dorsal spines have dark tips. Pelvic and anal fins are clear. Pectoral and caudal fins are dark-banded. Body bears irregular dark blotches, which extend onto the dorsal spines and rays. A dark band extends across the cheek below

the eye, and another dark band passes onto the snout from the eye. The belly and chest are unmarked; the chin is dark-blotched. The peritoneum is speckled with black.

Myoxocephalus quadricornis (Cuvier and Valenciennes)

Two specimens (No. 21). Fin counts: first dorsal, VIII (2); second dorsal (last element not included), 14 (2); anal (last element not included), 13 (1), 14 (1); pectoral, 16 (2); pelvic, I, 3 (2). The specimens are 26 and 29 mm. in standard length. They agree with specimens of similar size from Point Barrow, Alaska, but differ in possession of a row of about 30 conical papillæ on each side below the dorsal fins. The larger specimen has part of a second row of papillæ below the first. Such structures do not appear on the fishes from Point Barrow until a length of about 40 mm. has been reached.

Liparis sp. (? **liparis** (Linnaeus))

Two small individuals (No. 20). Fin counts: dorsal, 41, 42; anal, 35, 36; pectoral rays about 32. Gill opening extends down 1 to 3 pectoral rays.

Liparis koefoedi Parr

Six specimens (No. 20) and one specimen (No. 19). Fin counts: dorsal, 47 (4), 48 (1), 49 (1); anal, 39 (1), 40 (2), 41 (2), 42 (1); pectoral, 37 (1). Pyloric caeca: 23 (1), 25 (1). The internal pigmentation can be seen through jelly and skin. The peritoneum appears uniform deep black (actually it is densely black-flecked when the body cavity is examined). There is a black longitudinal stripe on the body musculature, running along the base of the dorsal elements. The external pigmentation (on the skin) is as follows: head, dusky dorsally; chin, dusky; upper half of pectoral fin, black-flecked; 3 to 5 wavy dark bands on the dorsal fin, body, and anal fin; caudal fin with 2 faint wavy dark bands, the first at its base, the second near its middle. The dorsal and anal fins are adnate to the caudal for less than half the length of the caudal. The dorsal fin is unlobed. The caudal fin is rounded at the tip. The lower pectoral lobe reaches beyond the rear of the pelvic disk. The gill opening extends downward 4 to 8 pectoral rays and is greater than the eye. The anus is very close to the anal origin; a small papilla is present. The snout projects slightly, and the lips are thin. The profile of the head is evenly convex from the dorsal origin to the mouth. There is a thick layer of clear, colourless jelly between the skin and the body musculature and between the skin and the fin elements. The first few dorsal and anal elements are not visible externally because of the "edema" caused by the jelly.

Mr. Richard Backus, Cornell University, will describe this form. Similar individuals have been collected from Labrador by the "Blue Dolphin" Expedition. Mr. Backus will give measurements of the Alert specimens in his doctorate thesis.

LIST OF INVERTEBRATES

A diagram has been prepared (Figure 13) showing constructional details of an improvised dredge, by means of which much of this material was obtained. The following tentative identifications and notes are by E. L. Bousfield.

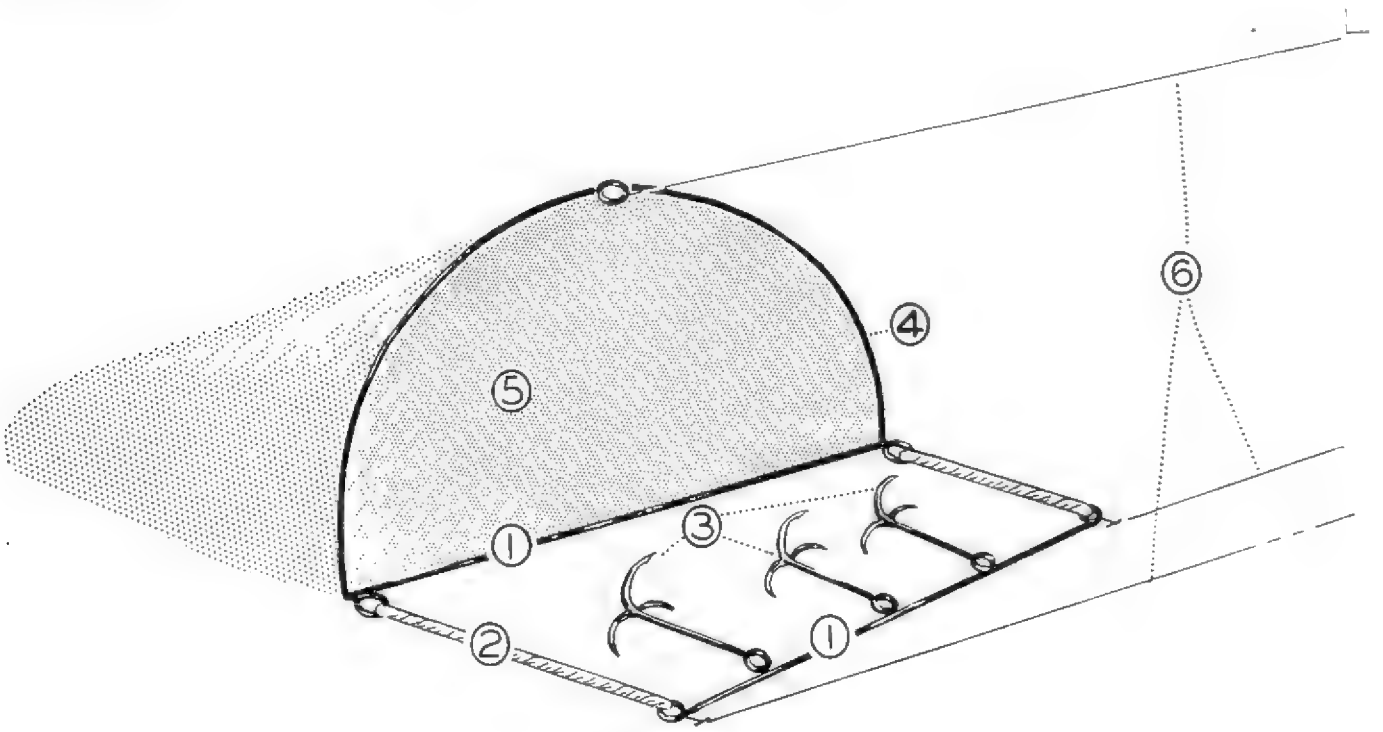


Figure 13. Sketch of makeshift dredge used in collecting marine invertebrates. It was extremely efficient for Crustacea, and small molluscs were taken also. 1, metal draw bars 30 inches in length; 2, quarter-inch rope or chains for flexibility; 3, grappling hooks to stir up bottom deposits; 4, metal hoop; 5, quarter-inch mesh minnow sieve; 6 hauling cables.

The invertebrate collection contains more than 1,650 specimens (41 lots), of more than 60 species, and is representative of nearly all the principal invertebrate groups from the Coelenterata to the Protochordata. The free-living species are mainly marine, but some were collected in fresh water, and others on the land. Both internal and external parasites of birds, mammals, and aquatic invertebrates are represented, some of which may not hitherto have been described. It is hoped that this collection will serve as a useful starting point for larger and more critical collections of invertebrates from other localities in the Canadian arctic.

COELENTERATA: *Cyanea, Beröe;* 2 lots (Nos. 11, 12), 3 specimens.

CESTODA: 4 lots (Nos. 29, 30, 31, 32) (4 hosts), 13 specimens.

NEMATODA: 2 lots (Nos. 28, 33) (2 hosts), 2 specimens.

ANNELIDA: Polychaeta, etc., 4 lots (Nos. 5, 7, 8, 11) (marine), 15 specimens;

HIRUDINEA, 1 lot (No. 6) (on decapod crustacean), 1 specimen.

CRUSTACEA: representatives of this class occur in 18 of the 41 lots and make up more than 75 per cent of the collection.

ANOSTRACA, *Branchinecta*, 1 lot (No. 40), 22 specimens;

CLADOCERA, *Daphnia*, 1 lot (No. 39), 10 specimens;

COPEFODA, *Calanus hyperboreus*, 3 lots (Nos. 15, 35, 41), 60 specimens;

OSTRACODA, 1 lot (No. 41), (fresh-water), 7 specimens;

CIRRIPEDIA, Rhizocephalia (on *Spirontocaris* sp.) 1 lot (No. 6), 2 specimens;

MYSIDACEA, *Mysis oculata* (most abundant marine invertebrate collected), 9 lots (Nos. 1, 4, 5, 6, 14, 15, 16, 17, 35), more than 850 specimens;

ISOPODA, *Munnopsis, Arcturus,* Epicaridea (on *Mysis*), 3 lots (Nos. 5, 8, 14), 7 specimens.

AMPHIPODA, 10 lots (Nos. 1, 3, 4, 5, 6, 8, 9, 16, 17, 35), more than 375 specimens; the second most abundant group of invertebrates, the family Lysianassidae occurs in 7 lots, *Gammarus* and *Gammaracanthus* each in 6 lots, Hyperiidea in 1 lot, and other species in 3 lots;

DECAPODA, *Spirontocaris,* 3 spp., and *Sabinea septemcarinata,* 5 lots (Nos. 2, 3, 6, 8, 16), 41 specimens.

INSECTA:

MALLOPHAGA, 2 lots (Nos. 25, 27) (2 hosts), 60 specimens;

ANOPLURA, 1 lot (No. 26) (1 host), 100 specimens;

TRICHOPTERA, 1 lot (No. 38) (winged adult), 1 specimen;

CHIRONOMIDAE, 2 lots (Nos. 41, 42) (larvæ), 7 specimens.

MOLLUSCA:

GASTROPODA, *Margarites, Buccinum,* 3 lots (Nos. 10, 11, 43), 38 specimens;

PELECYPODA, *Astarte, Mya,* 3 lots (Nos. 10, 11, 43), 9½ specimens.

BRYOZOA: *Lichenopora,* on *Laminaria,* 1 lot (No. 13), 6 colonies.

ECHINODERMATA: Asteroidea, 1 lot (No. 11), 2 specimens.

TUNICATA:

APPENDICULARIA, 1 lot (No. 15), 15 specimens;

ASCIDIACEA, 1 lot (No. 7), 1 specimen.

Unidentified: 3 lots (No. 34, stomach contents of Arctic Char; No. 36, stomach contents of Red-throated Loon; No. 37, stomach contents of Long-tailed Jaeger).

LIST OF PLANTS

Determined by A. E. Porsild

Equisetum variegatum Schleich.	Egerton Lake, Aug. 14.
E. arvense L.	4 miles W. of Cape Belknap, July 16.
E. arvense	Egerton Lake, Aug. 14.
Alopecurus alpinus Sm.	Cape Belknap, July 25.
A. alpinus Sm.	Mount Pullen, July 4.
Pleuropogon Sabinei R. Br.	Cape Belknap, July 25.
Poa abbreviata R. Br.	Parr Inlet, July 18.
P. abbreviata	Parr Inlet, July 18.
Carex stans. Drej.	Wood Creek, Aug. 14.
Eriophorum angustifolium Honck.	Ravine Bay, July 11.
E. Scheuchzeri Hoppe	Wood Creek, Aug. 14.
Juncus biglumis L.	Mount Pullen, July 4.
Luzula nivalis (Laest.) Beurl.	Mount Pullen, July 4.
Salix arctica Pall.	4 miles west of Cape Belknap, July 16.
S. arctica Pall.	Parr Inlet, June 17.
Oxyria digyna (L.)Hill	Parr Inlet, July 5.
Polygonum viviparum L.	4 miles west of Cape Belknap, July 16.
Arenaria Rossii R. Br.	Egerton Lake, Aug. 17.
Cerastium alpinum L.	Parr Inlet, July 5.
C. alpinum	Parr Inlet, July 18.
	Ravine Creek, near mouth, Aug. 8.
Melandrium apetalum (L.) Fenzl., ssp. *arcticum* (Fr.) Hult.	Cape Sheridan, July 19.

LIST OF PLANTS—*Concluded*

M. triflorum J. Vahl	Ravine Bay, July 11.
Stellaria longipes Goldie var. *"monantha"*	Ravine Pond, Aug. 5.
S. longipes Goldie var. *"monantha"*	Mount Pullen, Aug. 5.
Ranunculus aquatilis L. var. *eradicatus* Laest.	Cape Belknap, July 27.
R. Sabinei R. Br.	Ravine Bay, July 11.
R. sulphureus Sol.	Cape Sheridan, July 19.
Papaver radiatum Rottb.	Mount Pullen, July 9.
Ranunculus sulphureus Sol.	Mount Pullen, July 4.
Papaver radicatum Rottb.	Ravine Bay, July 11.
P. radicatum.	Parr Inlet, July 5.
Braya purpurascens R. Br.	Parr Inlet, July 18.
B. purpurascens	Ravine Bay, July 11.
Cochlearia officinalis L. ssp. *arctica* (Schlecht.) Hult.	Mount Pullen, July 4.
C. officinalis ssp. *arctica*	Ravine Bay, Aug. 5.
Draba alpina L.	Ravine Bay, July 11.
D. alpina	Parr Inlet, July 5.
D. Bellii Holm	Ravine Bay, July 11.
Saxifraga caespitosa L.	Ravine Bay, July 11.
S. flagellaris Willd.	Parr Inlet, July 18.
S. Hirculus L.	Wood Creek, Aug. 14.
S. nivalis L.	Mount Pullen, July 24.
Saxifraga oppositifolia L.	Parr Inlet, July 5.
S. tenuis Wahlenb.	Mount Pullen, July 4.
S. tenuis	Mount Pullen, July 24.
S. tricuspidata Rottb.	Ravine Pond, Aug. 5.
Potentilla hyparctica Malte	Mount Pullen, July 24.
P. pulchella R. Br.	Parr Inlet, July 18.
Dryas integrifolia M. Vahl	Parr Inlet, July 18.
Epilobium latifolium	Shirley Creek, Hilgard Bay, Aug. 14 (Paul F. Bruggemann).
Pedicularis hirsuta L.	Wood Creek, Aug. 14.
Taraxacum pumilum Dahlst.	Parr Inlet, July 18.

THE FISHES COLLECTED BY THE CANADIAN ARCTIC EXPEDITION, 1913-18, WITH ADDITIONAL NOTES ON THE ICHTHYOFAUNA OF WESTERN ARCTIC CANADA

By Vladimir Walters [1]

INTRODUCTION

Although the Canadian Arctic Expedition (C.A.E.) ended in 1918, the fish collections have not hitherto been reported on. Through the courtesy of Dr. F. J. Alcock and Dr. L. S. Russell of the National Museum of Canada, the writer visited Ottawa to study the fish collections because the C.A.E. collected in Arctic Alaska, which is the area to be covered in the writer's doctoral thesis. Dr. R. M. Anderson, of the same institution, very generously made available Mr. Frits Johansen's unpublished manuscript which concerns the fishes collected by the C.A.E. and the fishes of Arctic America in general.

Mr. Johansen's manuscript lists species and specimens collected by the C.A.E. which are not now in the National Museum of Canada. The collections were never catalogued, and thus it is almost impossible to determine the fates of the specimens subsequent to their arrival in Ottawa. According to notes in some of the fish bottles, some specimens were sent to the United States National Museum, American Museum of Natural History, British Museum of Natural History, Royal Ontario Museum of Zoology, and the Zoological Museum in Oslo, but a complete list of specimens shipped to these or other institutions could not be found. There is no record of which specimens, if any, were subsequently discarded.

Mr. Johansen's field notes and coloured plates could not be located. Most of the references to colour patterns and morphogenesis which appear in his manuscript have therefore been omitted from this report.

ANNOTATED LIST

The C.A.E. collected some fishes in the Bering Sea, but as any marine locality south of 65° 40′ N. (Bering Strait) is not considered entirely arctic at present, these specimens (for the most part larvæ of dubious identification) have been ignored.

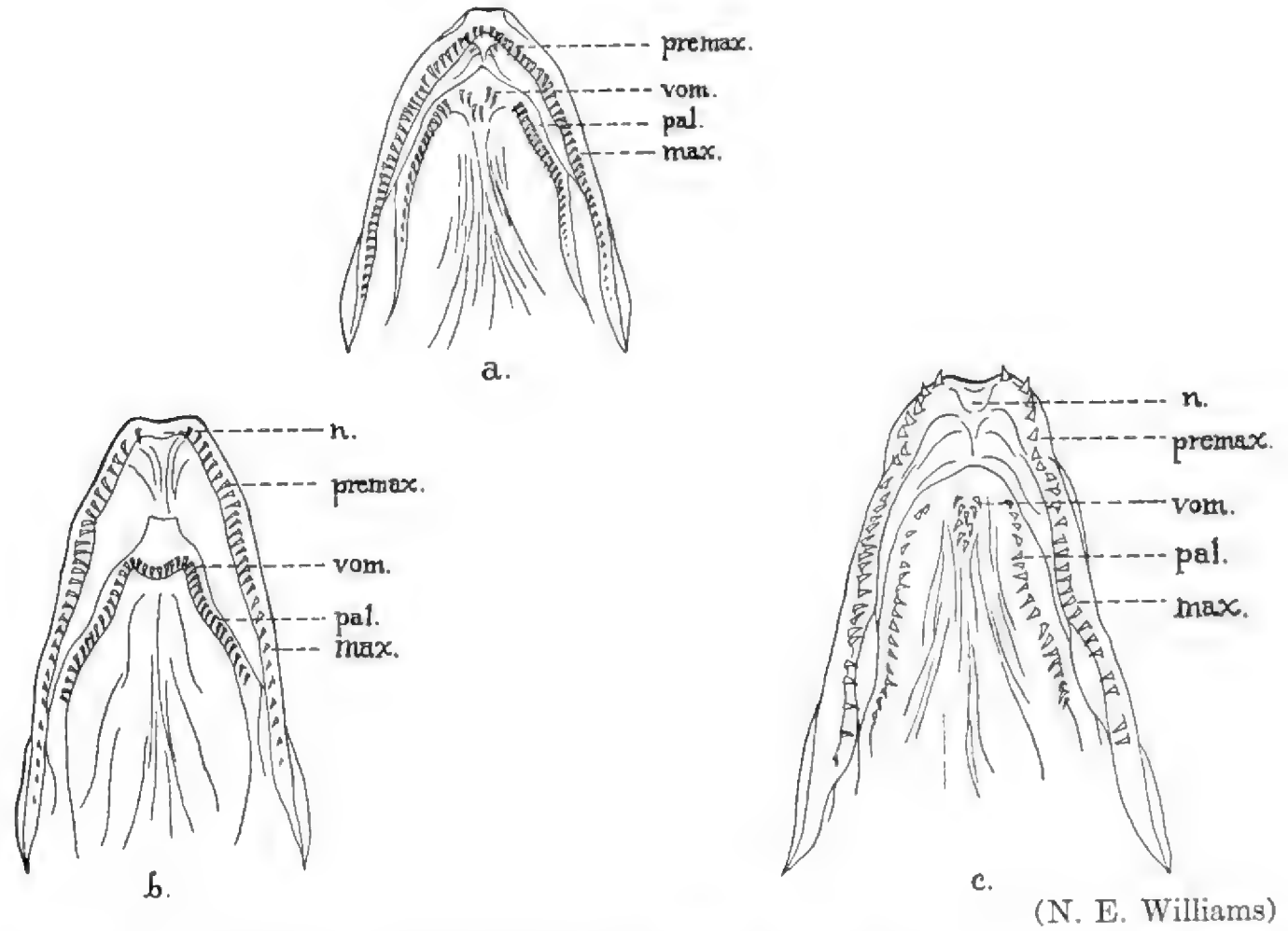
For information concerning the C.A.E. and the plants and animals collected, the reader is referred to the series entitled "Report of the Canadian Arctic Expedition 1913-18."

Use of Parentheses

Species mentioned in Mr. Johansen's manuscript, but which could not be located, are listed in parentheses. Locality records listed in Mr. Johansen's manuscript but which could not be located are enclosed in parentheses. Where the name of a species in this report differs from that used in Mr.

[1] Department of Biology, New York University, New York 53, N.Y., U.S.A.

Johansen's manuscript, the name used by Mr. Johansen is enclosed in parentheses and is listed after the name employed. Names in parentheses therefore do not necessarily refer to synonyms.



(N. E. Williams)

Figure 14. Three dentitional variants of *Salvelinus alpinus* (L.)

a. Female from Collinson Pt., Alaska; head length 71 mm.; collected July 21, 1914. The vomerine teeth and the palatine teeth are separate, and the vomerine teeth are grouped in a cluster at the head of the bone. This is the condition typical of *Salvelinus*.

b. Male from Collinson Pt., Alaska; head length 88 mm.; collected July 21, 1914. The vomerine and palatine teeth form a continuous uniserial horseshoe-shaped strip. This is the condition typical of the genera *Hucho* and *Brachymastax*.

c. Male from Bernard Harbour, N.W.T.; head length 182 mm.; collected Oct. 1, 1914. The vomerine teeth and the palatine teeth are separate, and the vomerine teeth are arranged on the head of and along a posteriorly-directed crest (or appendix) of the bone. This is the condition typical of *Cristivomer*. This specimen exhibits the closest approach to *Cristivomer* dentition of all of the C.A.E. specimens, but most of the specimens exhibit the vomerine appendix to some extent.

abbreviations used: max.—maxillary teeth; *n.*—notch in upper jaw of male; *pal.*—palatine teeth; *premax.*—premaxillary teeth; *vom.*—vomerine teeth.

Species Which Were Not Collected By C.A.E.

Certain species and locality records in this paper were not got by the C.A.E.; appropriate notations appear in the text. Only those species which have been reported from the Arctic Life Zone are included in this report. Some freshwater species, notably the cyprinids *Couesius plumbeus* and

Platygobio gracilis, were listed by Preble (1908) from localities almost within the Arctic Life Zone but are not included here, because there is no evidence that they do occur in the arctic zone.

Fin Counts

Mr. Johansen included all elements in all fin counts in his manuscript. Except for stichaeids, zoarcids, and liparidids, the dorsal and anal ray counts are given as one lower than the manuscript figures. This has been done to conform with counts made by the writer, which in most cases have been consolidated with Mr. Johansen's counts. Spine counts and paired fin counts are presented as given by Mr. Johansen.

Petromyzonidae

Lampetra japonica (Martens)

Not collected by the C.A.E. Two individuals were collected in a freshwater creek in the Mackenzie delta on January 6, 1932, by Mr. A. E. Porsild.

Porsild's specimens, which constitute the first cyclostome record for the American Arctic coast, are ammocoetes and are not identifiable to subspecies. They measure 109 mm. and 106 mm. (tip of tail missing and body broken in two) in length. The specimens are extremely oily with the larger one having drops of oil visible beneath its skin.

Rawson (1951) listed the Great Slave Lake lamprey as *Entosphenus japonicus septentrionalis*. Berg (1931), in naming this form, placed it in the genus *Lampetra* and regarded *Entosphenus* as monotypic (*E. tridentatus*).

Clupeidae

Clupea harengus pallasi (Cuvier and Valenciennes) (*Clupea pallasii*)

Seen at Shingle Point (Mackenzie Delta), Y.T., and at Cape Bathurst, N.W.T., in summer and autumn of 1914, 1915, and 1916.

Anderson (1913) caught 11 barrelsful of herrings with one haul of a 200-foot seine at Cape Bathurst.

Gill raker counts of 3 Cape Bathurst fishes range from 65 to 69 (av. 67), with 44 to 47 below the angle of the arch. Dorsal rays of these specimens vary from 16 to 17; anal rays 14 to 17; pectoral rays 15 to 18; and pelvic ray count is 9.

Salmonidae

Oncorhynchus spp.

No Pacific salmon were seen by the C.A.E.

The first record for Pacific salmon in the Canadian Arctic is in Preble (1908). Trappers reported salmon as occasional in the Mackenzie River, Arctic Red River, and Peel River. Preble questionably listed the species as *O. nerka*.

Only two species of *Oncorhynchus* have been collected from Arctic Ocean drainages; these are *O. gorbuscha and O. keta*. Both species range

from the Lena system of Siberia in the west (N. F. Pravdin, p. 150, and R. S. Semko, p. 154, in Berg, Bogdanov, Kozhin, and Rass 1949) to the Mackenzie system of Canada in the east (Dymond 1940).

Salvelinus alpinus (Linnaeus) **(S. alpinus, S. malma, S. oquassa marstoni,** and **Cristivomer namaycush** in part)

Seen by the C.A.E. at numerous localities, but specimens now in Ottawa were collected at Hot R., tributary to Sadlerochit R., 25 mi. inland from Camden Bay, Alaska; Collinson Pt., Alaska; lake at Colville Hills, Wollaston Peninsula, Victoria I., N.W.T.; lakes, streams, and lagoons at Bernard Harbour, N.W.T.

All charrs (except *S. namaycush*) collected by the C.A.E. are considered to belong to the *S. alpinus* complex, without reference to subspecies or other categories. Mr. Johansen's manuscript fails to mention which criteria were employed to separate the three species recognized by him.

Adult arctic charrs are available from only two localities, Collinson Pt. and Bernard Harbour, which are over 700 miles apart. Differences are therefore difficult to interpret.

Two Collinson Pt. individuals have 19 and 22 gill rakers and 29 and 31 pyloric caeca. Forty-seven Bernard Harbour specimens gave variations 22 to 27 gill rakers (mean 24·6, single standard deviation 1·48). Five Bernard Harbour specimens have a range of 45 to 49 pyloric caeca.

The adult arctic charrs now in the National Museum of Canada show considerable variation in vomerine and palatine dentition. Three specimens were selected and their mouths drawn to illustrate the extremes found in adult fish collected by the C.A.E. (see figure 14). Typical *Salvelinus* dentition is shown by the Collinson Pt. female in which the palatine teeth are separated from the vomerine teeth by a gap on each side, and the vomerine teeth lie in a cluster at the head of the bone. *Cristivomer* dentition is shown by the Bernard Harbour male which has the palatine teeth separated from the vomerine teeth by a gap on each side, and the vomerine teeth are located both on the head and on a crest of the bone (subsequent dissection proved the crest to be free of the shaft of the vomer). The dentition of the Collinson Pt. male is similar to that of the Asiatic genera *Hucho* and *Brachymastax;* according to Berg (1932). The vomerine and palatine teeth of these genera are united in a continuous horseshoe-shaped strip.

The dentitional variability of *S. alpinus* is evidently not confined to a few isolated localities. Pfaff (1937) reported that the vomers of some *S. alpinus* collected by the Fifth Thule Expedition (in Keewatin and Franklin Districts) were more or less like the vomers of *Salvelinus* (*Cristivomer*) *namaycush*. Kendall (1914) also remarked upon the variability of the vomerine and basibranchial dentition of the *S. alpinus*, *S. fontinalis*, and *S. namaycush* groups. The extreme vomerine and palatine dentitional variability of *S. alpinus* in Arctic America indicates that dentitional differences between the various salmonid genera are not by themselves valid generic characters.

Salvelinus namaycush (Walbaum) **(Cristivomer namaycush** in part)

Lake on Wollaston Peninsula, Victoria I., N.W.T.; lakes at Bernard Harbour, N.W.T.

Anderson (1913) listed the lake trout as occurring in large inland lakes from Alaska east to Coronation Gulf.

The occurrence of the lake trout in the Canadian Archipelago (Victoria I.) indicates that this fish may be able to disperse across brackish or even salt water. Pfaff (1937) listed lake trout from King William Land, which is also in the archipelago. A specimen in the American Museum of Natural History was caught 5 miles offshore in Hudson Bay, which is evidence in support of the suggestion that this species can withstand brackish water. Mr. Johansen's manuscript mentions that lake trout were encountered by several C.A.E. parties in the mouths of some of the large rivers near Coronation Gulf, but no specimens were saved.

Kendall (1914) and Pfaff (1937) were among several workers who have opined that *Cristivomer* is not generically distinct from *Salvelinus*. Kendall stated that the vomers of the *S. alpinus* and *S. fontinalis* groups are subject to considerable variation and each intergrades independently with *S. namaycush*. Pfaff observed that some specimens of *S. alpinus* collected by the Fifth Thule Expedition had vomers more or less like the vomer of *Cristivomer*.

The C.A.E. specimens of *S. alpinus* similarly show great variation in dentition (see the discussion of *S. alpinus*, above) which in some specimens closely approaches the *Cristivomer* condition.

The pattern of light spotting in some C.A.E. specimens of *S. alpinus* approaches the pattern of *S. namaycush* in that some arctic charrs have faintly spotted dorsal and/or caudal fins, and the spots on the backs of some specimens approach a vermiform pattern. The writer has not seen any arctic charrs with spotted adipose fins.

When a monotypic genus is obviously closely related to a larger genus, the monotypic genus should be reduced to a subgenus if it does not have priority. The writer regards *Cristivomer* as a subgenus of *Salvelinus*.

Coregonus clupeaformis (Mitchill)

Not collected by the C.A.E.

V. Stefansson collected a 63-mm. specimen from the Horton River, N.W.T. There are 21 gill rakers and about 63 scales along the lateral line.

Coregonus nasus (Pallas) **(C. kennicotti)**

Port Epworth, Mouth of Tree River, Coronation Gulf, N.W.T.

A single male lacking breeding tubercles but 350 mm. in standard length, was caught on October 14, 1915. Eye 2·3 in caudal peduncle depth; postorbital head length 1·69 in head length; 91 scales to the base of the caudal fin; 21 gill rakers.

Contrary to the views of Dymond (1943), two species of *Coregonus* (s. str.) occur in the western American Arctic; data to support this statement will be presented in the writer's thesis.

Leucichthys autumnalis (Pallas) **(Argyrosomus lucidus)**

(Mouth of Marsh River, Collinson Pt., Alaska); Collinson Pt., Alaska; Kamakok, Y.T.; Pauline Cove, Herschel I., Y.T.; (Shingle Pt., Mackenzie Delta, Y.T.); (Walker Bay, west side of Victoria I., N.W.T.); Cape Bathurst, N.W.T.; Bernard Harbour, N.W.T.

Scale counts (to the base of the caudal fin) of 9 specimens range from 82 to 94, with a mean of 88·6. The specimens came from the following localities: Bernard Harbour, 1; Cape Bathurst, 1; Pauline Cove, 2; Kamakok, 2; Collinson Pt., 3.

Gill raker counts of 15 specimens range from 39 to 45, mean 41·8, distributed as follows: Collinson Pt., 4 sp., mean 42·8; Kamakok, 2 sp., mean 43·0; Pauline Cove, 2 sp., mean 39·5; Cape Bathurst, 6 sp., mean 41·5; Bernard Harbour, 1 sp., count 42.

The premaxillaries of this species are retrorse. The first rays of the depressed dorsal fin reach about as far back as do the last.

The C.A.E. specimens were collected in river mouths, bays, and coastal salt water. This species was collected together with *Clupea harengus pallasi* when the herrings were beginnig to run. Male whitefishes with breeding tubercles were collected at Collinson Pt. (July 21), Cape Bathurst (July 26), and Kamakok (Aug. 3). The 15 specimens range from 305 to 365 mm. in standard length.

L. autumnalis is closely related to *L. artedi* (see Dymond, 1943); Dymond regarded *L. artedi* to include *L. lucidus* as a synonym. Unfortunately, *L. autumnalis* has been listed in the earlier literature as *L. lucidus*. *L. autumnalis* is a salt water species which migrates into fresh water to spawn; *L. artedi* is a freshwater species. Thus MacFarlane's (1891, in Preble 1908), Scofield's (1899), Giroux's (in Preble 1908), and Anderson's (1913) records of *Leucichthys* (*Argyrosomus*) *lucidus* should be referred to *L. autumnalis*, since all of these records refer to fishes found either in salt water or on migratory runs up the larger rivers.

The longitudinal range of *L. autumnalis* is from the Mezen River (White Sea) in the west (Berg, 1932) to Coronation Gulf, N.W.T., in the east.

Leucichthys sardinella (Valenciennes) **(Argyrosomus pusillus)**

Somewhere between the Colville River, Alaska, and Dolphin and Union Strait, N.W.T.

Scofield (1899) listed *A. pusillus* as abundant at Barter Island, Alaska, which lies within the area that the C.A.E. specimen is believed to have come from.

? Leucichthys tullibee (Richardson)

Not collected by the C.A.E.

The record for this species is tarnished by a lack of specimens. Simpson (1843, in Preble 1908) recorded "tullibee" near the mouth of the Coppermine River, N.W.T., and Giroux (in Preble 1908) said that the fish abounds in the Arctic Red River, where it comes in from the sea to spawn.

This species was also recorded by Anderson (1913) who did not bring back any specimens but noted that the fish occurs in branches on the east side of Mackenzie Delta.

Pfaff (1937) recorded this species from Danish Island (near the north side of Vansittart Island) and questionably listed it from King William Land. He noted that the King William Land specimen might have been *Argyrosomus lucidus* (=perhaps *L. autumnalis?*), but he felt that it was *A. tullibee.* Even the Danish Island specimen was later stated by Pfaff to be questionably identified.

L. tullibee may occur in western Arctic Canada, but the records amassed thus far are probably based upon more than one species of fish. Simpson's, Giroux's, and Anderson's records, which indicate an anadromous fish, might have been either *Coregonus nasus* or *L. sardinella,* or both. The identity of Pfaff's specimens remains problematical.

Stenodus leucichthys nelma (Pallas) **(S. mackenzii)**

Shingle Pt., Mackenzie Delta, Y.T.

A 400 mm. male, with 22 gill rakers and 101 scales.

Berg (1932) considered *S. mackenzii* to be identical to *S. leucichthys nelma* and gave the range of the subspecies as from the Ponoi and Onega Rivers in the west to the Mackenzie in the east. Dymond (1943) regarded *S. mackenzii* as conspecific with *S. leucichthys.*

Dymond gave the range in scale count for 13 specimens from the Yukon River near Dawson, Y.T., the Slave River, and Arctic Red River as 97 to 107 (mean 102·3) and gill raker counts for 12 specimens ranged from 19 to 23 (mean 22·1). Berg gave the scale count range of Eurasian shee as 87 to 118, and gill rakers as (18) 19 to 23 (24).

The available data do not indicate subspecific differences between Eurasian and North American fishes since there is complete overlap in scale and gill raker counts of the two groups. The Canadian fishes do not show as much variation as do the Eurasian fishes, but this may be due to the small size of Dymond's sample and the small area from which the sample was taken. There is evidence that the shee may form size races for the different river systems it inhabits and that non-migratory lake-dwelling forms occur both in North America and in Eurasia. Berg's discussion of *S. l. nelma* mentioned that Lena River fishes attain weights of 30 to 35 kg. (about 66 to 77 lbs.) whereas adult Ob' fishes weigh 10 to 10·5 kg. (about 22 to 23 lbs.)

The range of the shee in Arctic Canada is from Herschel I., Y.T., east to Toker Pt., N.W.T., in brackish and salt water (Anderson, 1923) and in Liverpool Bay (Anderson, 1913) and the Anderson River (Preble, 1908). The fish also occurs in the Yukon system. The Liverpool Bay and Anderson River records mark the eastern limit of the range, about 200 miles east of the Mackenzie Delta.

THYMALLIDAE

Thymallus arcticus (Pallas) **(T. signifer)**

Hot River, tributary to Sadleerochit River, 25 miles inland from Camden Bay, Alaska. A small specimen was collected by V. Stefansson from the Horton River, N.W.T.

The grayling is reported to be widely distributed in western Arctic Canada (Evermann and Goldsborough, 1907; Preble, 1908).

Berg (1933) stated that Svetovidov's data on *T. signifer* from the Yukon and other parts of Arctic America showed it to be closely related to *T. a. pallasi* of Siberia. Berg (1936) called the American fish *T. a. pallasi*. Svetovidov (1936) listed *T. a. pallasi* from the Khatanga, Lena, and Kolyma systems of Siberia, and regarded the American graylings as closely related to the Siberian fishes.

The writer could find no differences between Siberian graylings (*T. a. pallasi*) and those from Arctic Alaska; *T. a. pallasi* certainly occurs in North America. The C.A.E. specimens and Stefansson's specimen are not identified to subspecies; because the eastward limit of the range of *T. a. pallasi* (if not synonymous with *T. a. signifer* and *T. a. montanus*) has not been determined.

OSMERIDAE

Mallotus villosus (Müller)

Pauline Cove, Herschel I., Y.T.

Only one specimen collected by the C.A.E. was found, and this is in the American Museum of Natural History.

? Osmerus eperlanus dentex (Steindachner) **(O. dentex)**

Not collected by the C.A.E.

Evermann and Goldsborough (1907) listed *O. dentex* from Arctic Red River; Preble (1908) stated that *O. dentex* was reported to be common at Arctic Red River throughout the summer and autumn. Anderson (1913) listed *O. dentex* from Cape Bathurst, N.W.T. This specimen was deposited in the American Museum of Natural History but cannot be located now.

The identification of this smelt to subspecies follows the identifications of previous workers. The actual identity of the fish, whether it is the Atlantic, Pacific, or another form of smelt, will have to remain unknown until more specimens are collected.

CATOSTOMIDAE

Catostomus catostomus (Forster)

Not collected by the C.A.E.

Simpson (1843, in Preble 1908) found suckers at the mouth of the Coppermine River. MacFarlane (1890, in Preble 1908) found them in the Anderson River. Preble (1908) reported the species to abound at the mouth of the Mackenzie in June. Anderson (1913) reported suckers to be common in parts of the Mackenzie Delta but brought back only one specimen, from the Colville River (Alaska).

It is not known whether the Asiatic *C. c. rostratus* or the American *C. c. catostomus* occurs in western Arctic Canada.

? Moxostoma aureolum (LeSueur)

Not collected by the C.A.E.

Preble (1908) listed *M. lesueuri,* a large-scaled sucker, from Arctic Red River and other localities. *M. lesueuri* is a synonym of *M. aureolum.* Unfortunately, no specimens were brought back.

ESOCIDAE

Esox lucius Linnaeus

Not collected by the C.A.E.

Preble (1908) reported the pike to be extremely abundant in all waters and listed it from the Anderson River. Anderson (1913) reported the species from lakes near Coronation Gulf in the east to the Mackenzie Delta in the west.

GADIDAE

Arctogadus pearyi (Nichols and Maxwell) **(Boreogadus saida** in part)

Port Epworth, Coronation Gulf, N.W.T.; Ibbett Bay, west side of Melville I., N.W.T. (skull); off Borden I., N.W.T., at 78° 30′ N., 115° W. (skeleton).

Arctogadus Drjagin may be recognized by the combination of 3 dorsal fins, 2 anal fins, and palatine teeth.

The C.A.E. specimens constitute the first record of this genus in North America, and considerably extend the range of *A. pearyi,* hitherto known only from the Lincoln Sea off northern Greenland.

Arctogadus is probably widely distributed in the American Arctic. Pfaff's data (1937) for fin ray counts of *"Boreogadus saida"* from Fury and Hecla Strait indicate the presence of *Arctogadus* sp. in the sample.

Fin counts of two Port Epworth specimens:

D_1 11(2); D_2 16(2); D_3 21(2); A_1 18, 19; A_2 21(2).

Fin counts of the Borden Island skeleton:

D_1 10; D_2 18; D_3 23; A_1 20; A_2 20.

The counts of this specimen were made by Mr. W. T. Leaplay of the U.S. National Museum.

Boreogadus saida (Lepechin) **(B. saida,** in part)

Barter I., Alaska; Collinson Pt., Alaska; Armstrong Pt., Victoria I., N.W.T.; off Stapylton Bay, Dolphin and Union Strait, N.W.T.; Young Pt., Amundsen Gulf, N.W.T.; Bernard Harbour, N.W.T.; Cape Barrow, Coronation Gulf, N.W.T.

This species probably occurs all along the American Arctic Coast. Scofield (1899) recorded the species from Herschel Island, Y.T.

Eleginus sp. **(Mirogadus proximus)**

The C.A.E. found this cod to be locally abundant along the Alaskan and Canadian Arctic coasts.

Mr. Johansen described the lateral line of four specimens from Bathurst Inlet (east side of Banks Peninsula) as a pale streak from the gill opening to beneath the beginning of the second dorsal fin. This is the lateral line form for *Eleginus*. In *Microgadus proximus,* as pointed out by Schultz and Welander (1935), the lateral line extends to beneath the last quarter of the third dorsal fin before breaking up.

It is possible that Anderson's (1913) records of *Microgadus proximus* from Toker Pt., Liverpool Bay, Coronation Gulf, and the eastern end of Langton Bay were actually *Eleginus* sp., but his specimens cannot be located to verify this suggestion.

Pfaff (1937) listed *E. navaga* from Simpson Strait (King William Land), but later in the text he mentioned that the specimen may have come from a locality as far west of Simpson Strait as eastern Coronation Gulf. Williamson (1907) illustrated a specimen of *Gadus navaga* from Greenland.

Whether the fish in the American Arctic is *E. navaga* or *E. gracilis* cannot be determined, for information on gill raker and vertebral counts of Arctic American specimens is wanting.

Fin counts of Bathurst Inlet fishes are as follows:

D_1 11 (1), 12 (3); D_2 17 (2), 18 (2); D_3 18 (2), 19 (1), 20 (1); A_1 18 (1), 19 (1), 20 (2); A_2 18 (1), 19 (1), 20 (2); P_1 18 (2), 19 (2).

Gadus ogac Richardson

Walker Bay, Prince of Wales Strait, Victoria I., N.W.T.; Kanayuk I., Bathurst Inlet, N.W.T.; (East Barry I., Bathurst Inlet, N.W.T.); (east side of Banks Peninsula, Bathurst Inlet, N.W.T.).

In a 15-inch (total length) skin, the premaxillary reaches to below the pupil. The lateral line is a groove anteriorly, breaking up beneath the second dorsal fin. The barbel slightly exceeds the diameter of the eye; the diameter of the eye is slightly less than the bony inter-orbital width.

Fin ray counts of three Bathurst Inlet fishes are as follows:

D_1 13-15; D_2 16-18; D_3 15-17; A_1 18-19; A_2 16-17.

The rock cod from Langton Bay reported by Anderson (1913) may have been either this species of *Arctogadus pearyi.* Anderson did not identify the fish to genus or species and did not bring back any specimens.

Lota lota leptura Hubbs and Schultz

Not collected by the C.A.E.

Simpson (1843, in Preble 1908) reported the burbot from the mouth of the Coppermine River. At a locality west of the mouth of the Mackenzie this fish was reported to come in with the rising tide. Preble (1908) related that numbers of burbot appear at Arctic Red River in mid-June, continue their migration upstream, and return in November and December. Anderson (1913) collected burbot from a lake at Horton River, about 35 miles south of Langton Bay, N.W.T., and remarked that the fish is universally distributed in fresh and brackish waters.

GASTEROSTEIDAE

Pungitius pungitius (Linnaeus)

?Barter I., Alaska; Cape Lambert, N.W.T.; Cockburn Pt., N.W.T.; Bernard Harbour, N.W.T. Mr. V. Stefansson collected a specimen at Okat Fishing Place, Langton Bay, N.W.T.

TABLE I

Dorsal Spine Counts for 343 Sticklebacks

—	VIII	IX	X	XI	XII
Bernard Harbour	4	97	207	29	1
Langton Bay	0	1	0	0	0
Cockburn Pt	0	0	1	0	0
Cape Lambert	0	1	1	0	0
?Barter Island	0	0	0	1	0
Total	4	99	209	30	1

The marked skew towards the lower spine counts may be due either to a mixture of races or to natural selection.

STICHAEIDAE

Eumesogrammus praecisus (Kröyer)

Walker Bay, west side of Victoria I., N.W.T.

One specimen, 110 mm. in standard length, is believed to have been caught in deep water. The specimen had 4 lateral lines, of which only the second from the top was complete, 45 spines in the dorsal fin and 33 elements in the anal fin. Mr. Johansen did not distinguish between anal spines and anal rays, although in this species the last few anal elements are spines.

This is the first record of the species for the Beaufort Sea. The range is given below:

Described from the west coast of Greenland; Labrador (Backus, 1951); Hudson Bay (Vladykov, 1933); Beaufort Sea; Bering Sea and Sea of Okhotsk (Schmidt and Andriashev, 1935). The absence of this species from the Chukchi Sea and the seas of Arctic Siberia may be due to the shallowness of these bodies of water.

ZOARCIDAE

? Gymnelis viridis (Fabricius)

(In the stomach of a *Myoxocephalus scorpius* from Goulburn Pt., Bathurst Inlet, N.W.T.); 70° 13′ N., 140° 15′ W., in a seal stomach.

Both specimens were identified by Mr. Johansen. Neither specimen was originally in good condition, and the specimen in Ottawa has disintegrated.

The identity of the specimens is questionable for there are several zoarcid genera which lack pelvic fins, although *Gymnelis* is the commonest and the others have not been recorded from Arctic America.

? Lycodes turneri Bean **(L. mucosus)**

Bernard Harbour, N.W.T.

A 220-mm. specimen was found dead on the ice, but in rather poor condition. The vomer and palatines were toothed. The lateral line was mediolateral. Scales were absent. D 90, A 70, P_1 18 are the fin counts.

Mr. Johansen's description of the specimen, not all of which is given here, fits *L. turneri* as well as *L. mucosus*. He regarded *L. turneri* as identical to *L. mucosus*. The specimen is listed here as *L. turneri* because the C.A.E. locality lies well within the range of *L. turneri* (Siberia east to the Gulf of St. Lawrence). The taxonomic status of the various forms of "scaleless' *Lycodes* (*Lycodalepis*) has not been worked out to any degree of satisfaction.

AMMODYTIDAE

Ammodytes tobianus Linnaeus **(A. alascanus)**

Bernard Harbour, N.W.T. (from a seal stomach); Mr. V. Stefansson collected a specimen at Okat Fishing Place, Langton Bay, N.W.T.

None of the specimens are in good shape. One Bernard Harbour specimen has more than 52 dorsal spines, two have 27 and 29 anal rays, one has 15 pectoral rays, but the body ridges are not countable.

COTTIDAE

Artedius (?) **dydymovi** Soldatov **(A. pacificus,** close to **A. uncinatus)**

Dolphin and Union Strait, west of Cockburn Pt., N.W.T.

Two specimens were taken at 10 to 15 fathoms. The following notes are based on the description in Mr. Johansen's manuscript.

There is a deep black blotch at the distal end of the sixth spine of the first dorsal fin. There is little sign of the opercular and nasal spines, but the preopercular spines are well developed, and the upper one is uncinate. The parietal spines are small and obtuse. There are two pairs of cirri, one above the eyes (frontal) and the other at the angle of the mouth (maxillary).

D_1 VII, VIII; D_2 12, 14; A 10, 12; P_1 21 (2).

The two specimens were 35 and 40 mm. in standard length.

The few cirri and smoother head surface of these specimens distinguishes them from *A. scaber*. Mr. Johansen's manuscript does not mention whether or not all four preopercular spines were well developed, therefore the identification must be tentative.

Artediellus scaber Knipowitsch **(A. pacificus)**

69° 35′ N., 163° 27′ W., between Cape Sabine and Icy Cape, Alaska.

Three specimens were caught at 11 to 12 fathoms. The following notes were taken from Mr. Johansen's manuscript.

The head is large, flat, and very porous-papillose on the upper surface. There is a short maxillary cirrus; two short cirri before the (upper?) preopercular spine; 3 to 4 smaller cirri at the beginning of the lateral line; a large opercular cirrus and a large frontal cirrus. A dozen other cirri which decrease in size posteriorly are arranged beneath the dorsal fins in an irregular row which ends past the fifth ray of the second dorsal fin. The skin-covered (upper?) preopercular spine is about half the diameter of the eye, broad, blunt, and uncinate.

In the largest specimen, a male, the tips of the first 5 dorsal spines are free and filamentous. The large male has a blue-black blotch in the upper rear part of the first dorsal fin.

D_1 VIII (2), IX (1); D_2 12 (3); A 8 (1), 10 (2); P_1 20 (1), 21 (1), 22 (1).

The specimens ranged from 35 to 49 mm. in standard length.

Mr. Johansen identified these specimens as identical with another series from the Chukchi Sea. The writer has examined the latter specimens, which are in the collections of the American Museum of Natural History, and considers them to be *A. scaber*.

Gymnocanthus sp. (**G. pistilliger** in part)

69° 35′ N., 163° 27′ W., between Cape Sabine and Icy Cape, Alaska); Bernard Harbour, N.W.T.

Mr. Johansen's manuscript does not mention the appearance of the top of the head in the Alaskan specimens, which were small fish, and therefore the writer cannot verify Mr. Johansen's identification. The two Bernard Harbour specimens, caught October 1, 1915, measure about 12 mm. in length.

Gymnocanthus pistilliger (Pallas) (**G. pistilliger** in part)

Bernard Harbour, N.W.T.

Only one specimen, a female, could be located, and this is in the collections of the American Museum of Natural History.

Several adults were collected by the C.A.E. Their standard length ranged from 135 to 205 mm.

D_1 X (1), XI (7), XII (2); D_2 14 (1), 15 (8), 16 (1); A 16 (7), 17 (3); P_1 19 (2); lateral line pores 42 (1).

Distinguished from the following species by the possession of three pairs of bony spines behind the frontal spines. *G. tricuspis* lacks these. Adult males of *G. pistilliger* have club-shaped cirri in the axillary region.

Gymnocanthus tricuspis (Reinhardt)

Bernard Harbour, N.W.T.

An adult male and female measured 119 and 148 mm. in standard length, respectively. The upper preopercular spine is pentafid in the female and quadrifid in the male. The number of points is not a sexual character but tends to be indicative of the size of the fish.

D_1 XI (2); D_2 15, 16; A 16, 17; P_1 18, 19; lateral lines pores 39 (1).

Icelus bicornis (Reinhardt)

Bernard Harbour, N.W.T.; (off Cockburn Pt., Dolphin and Union Strait, N.W.T.); (west of Cockburn Pt., N.W.T.).

The fin counts are given for individual specimens:

59 mm., Cockburn Pt.: D_1 IX; D_2 19; A 14; P_1 18 (F. J. count)
40 mm., Cockburn Pt.: D_1 IX; D_2 20; A 17; P_1 18 (F. J. count)
26 mm., Cockburn Pt.: D_1 IX; D_2 19; A 12; P_1 15 (F. J. count)
24 mm., Bernard Harbour: D_1 XI; D_2 18; A 18; P_1 19; P_2 I, 4 (V. W. count)
13 mm., Bernard Harbour: not countable.

The writer considers Mr. Johansen's pectoral and anal ray counts of the 26 mm. Cockburn Pt. specimen as doubtful; they seem too far out of line from the other specimens.

The following notes are based upon material taken from Mr. Johansen's manuscript:

Description of a 59 mm. female from Cockburn Pt.: head, 2·7 in standard length; eye, 2·8 in head and 7·4 in standard length; interorbital 4 in eye and 11 in head. Nasal spines borne on an obtuse process. Post-orbital ridge roughened by small spines. Parietal spines consist of a small obtuse spine in front of a large, rough, backwards-curved spine bearing small spines on its upper surface. Preopercular spines four, the upper one hooked and bifid at its tip. There is a row of bony tubercles on each side of the body above the lateral line, from beneath the middle of the first dorsal fin to the narrowest part of the caudal peduncle; these are smaller and less distinct than the row of bony plates which covers the full length of the lateral line. There are smaller, scattered bony tubercles between the two rows already described. There are a few scattered bony tubercles below the lateral line, mainly between it and the vent. There is a deep groove between the eyes and the parietal spines. Cirri are not mentioned in the manuscript, and the writer did not find cirri in either of the Bernard Harbour specimens.

Myoxocephalus quadricornis hexacornis (Richardson) **(Oncocottus hexacornis)**

The nomenclature follows that used by Berg and Popov (1932).

Pt. Barrow, Alaska; Martin Pt., Alaska; Collinson Pt., Alaska; (Herschel I., Y.T.); Walker Bay, Prince of Wales Strait, Victoria I., N.W.T.; Cockburn Pt., N.W.T.; Bernard Harbour, N.W.T.

Giroux (in Preble, 1908) reported that this species ascends the Mackenzie, rarely getting to Arctic Red River.

The large, cancellous, knobbed frontal and parietal spines which are characteristic of this fish are subject to considerable variation. In adults they are usually well developed and club-like, but in some of the Collinson Pt. (Camden Bay) individuals these spines are reduced to long low bumps. An intermediate condition is seen in other individuals, in which rows of spinelets develop on ridges in the loci of the frontal and parietal spines. A 176 mm. Bernard Harbour female has *two* pairs of well-developed parietal spines.

There are four preopercular spines in all specimens, and the tips of the upper spines are split into two or three tines in some fishes.

The distance between the bases of the first two dorsal spines varies from almost nothing to a distance equal to that between the bases of the second and third spines. The latter condition is the commonest.

The lateral line is incomplete in all but one specimen.

TABLE II

Fin Counts

—	First Dorsal				Second Dorsal					Anal					Pectoral		
	VI	VII	VIII	IX	11	12	13	14	15	12	13	14	15	16	15	16	17
Bernard Hbr.....	0	8	22	11	0	5	16	16	2	5	20	14	1	0	4	28	3
Alaska*.....	1	2	7	2	1	2	5	3	0	1	2	3	4	1	0	7	5

* Martin Pt. and Collinson Pt. individuals.

Myoxocephalus scorpioides (Fabricius)

Bernard Harbour, N.W.T.; (Young Pt., Stapylton Bay, Dolphin and Union Strait, N.W.T.)

D_1 VIII (1), IX (3), X (2); D_2 15 (4), 16 (2); A 11 (5); P_1 16 (4).

Myoxocephalus scorpius (Linnaeus) **(M. s. groenlandicus)**

69° 35′ N., 163° 27′ W., between Ice Cape and Cape Sabine, Alaska; 70° 24′ N., 161° 25′ W., near Icy Cape, Alaska; Bernard Harbour, N.W.T.; (Goulburn I., Bathurst Inlet, N.W.T.).

This sculpin is not identified to subspecies because the status of the Chukchi Sea form is not yet clear.

TABLE III

Fin Counts

—	D_1		D_2				A					P_1	
	X	XI	14	15	16	17	10	11	12	13	14	17	18
N. W. T.....	12	3	0	5	9	1	1	1	4	7	1	2	2
Alaska.....	3	1	1	3	0	0	0	0	1	3	0	0	2

The number of anal rays serves to separate most specimens of *M. scorpius* from *M. scorpioides,* but this will not serve for all localities, since fin counts of both species tend to vary with the locality.

The best characters for separating the two species are the prickly or pimply interorbital, occiput, and nape of larger specimens of *M. scorpioides* contrasted with the smoother surface of *M. scorpius.* The poorly-developed

(skin-covered bumps) frontal and parietal spines of *M. Scorpioides* also contrast with the well-developed blunted spines (usually with accessory spines) of *M. scorpius*. Smaller specimens (less than about 50 mm. in standard length) are not so easy to tell apart.

Triglops pingeli Reinhardt

West of Cockburn Pt., Dolphin and Union Strait, N.W.T., at 10 to 15 fathoms.

A single specimen, 59 mm. in standard length. Head, 3·7 in standard length; eye, 4 in head; interorbital, 2 in eye, 29·5 in standard length, and 8 in head; pectoral fin 1·1 in head; and pelvic fin, 2 in head.

Mr. Johansen's manuscript gives no information regarding the number of skin folds, the number of lateral spines, or other characters.

D_1 XI; D_2 21; A 23; P_1 19.

A subspecific designation cannot be assigned on the basis of a single specimen, especially since this is the first record from the Beaufort Sea area.

Laparididae

? Liparis koefoedi Par **(L. fabricii)**

Collinson Pt., Alaska.

A single post-larva, 19 mm. in length, was taken pelagically in open water at the entrance to the lagoon on October 8, 1913. Mr. Johansen's manuscript states that the coloration of this specimen agreed with his description of the coloration of Greenland *L. fabricii* (Johansen, 1912). This latter form was shown by Parr (1932) to be *L. koefoedi.*

Mr. Johansen's manuscript gives the number of dorsal elements of the Collinson Pt. Specimen as 45 to 50, which is in line with counts for *L. koefoedi.* The writer cannot confirm Mr. Johansen's count because of the present state of the specimen. There are 35 pectoral rays, and the gill opening extends down 8 or 9 pectoral rays, which is also in agreement with descriptions of *L. koefoedi.*

If this specimen is *L. koefoedi,* it represents a considerable westward extension of the American range, from 63° 51′ W. in Labrador (Backus, 1951) to 144° W. in Alaska. The species is probably circumpolar, being known from Kara Sea, Barents Sea, Spitsbergen, Greenland (Parr, 1932); Laptev Sea (Andriashev, 1939); Labrador (Backus, 1951); northern Ellesmere Island (Alert) (collected by Mr. S. D. MacDonald in 1951); Alaska.

Liparis liparis (Linnaeus)

Collinson Pt., Alaska, Bernard Harbour, N.W.T.; (off Stapylton Bay, Dolphin and Union Strait, N.W.T.).

The Collinson Pt. specimen is a post-larva less than 15 mm. long, taken pelagically beneath sea ice on October 6, 1913. It was identified by Mr. Johansen on the basis of coloration.

Fin counts for Bernard Harbour specimens:

D 41, 42, 45; A 35, 36, 37; P_1 34, 36.

Liparis herschelinus, described by Scofield (1898) from Herschel Island, Y.T., is probably identical to *L. liparis,* or at best is a subspecies of *L. liparis.*

PLEURONECTIDAE

Liopsetta glacialis (Pallas)

Pauline Cove, Herschel I., Y.T.

Three females, ranging from 22·5 to 24 cm. in total fresh length. All dextral. Lateral line count and dentition are not mentioned in Mr. Johansen's manuscript.

D 55, 59, 62; A 40, 44, 47.

Platichthys stellatus (Pallas) **(Pleuronectes stellatus)**

Port Epworth, mouth of Tree River, Coronation Gulf, N.W.T.

Anderson (1913) recorded the starry flounder from Franklin Bay (Langton Bay), east of Cape Bathurst, N.W.T.

Thirteen specimens, all sinistral, were taken by the C.A.E. Only nine dried specimens can be located in Ottawa, and these range from 140 to 275 mm. in standard length.

Fin counts (made by V. W.): D 49 to 58, mean 52·8 (5 sp.); A 36 to 40, mean 37·7 (6 sp.).

Anderson's specimens cannot be located in the American Museum. Mr. Johansen had examined these and noted the fin counts for one individual as D 56, A 38. Both specimens were sinistral.

The cumulative count for Northwest Territories flounders is,

D 49 to 58, mean 53·6 (6 sp.); A 36 to 40, mean 37·7 (7 sp.).

ACKNOWLEDGMENTS

The writer wishes to express appreciation to Dr. F. J. Alcock and Dr. L. S. Russell, National Museum of Canada, who made possible his visit to that institution; to Dr. R. M. Anderson, of the same institution, who permitted the writer to examine Mr. Johansen's manuscript; to Mr. J. T. Nichols, American Museum of Natural History, who allowed the writer to examine the collections there; and to Mrs. N. L. Williams, who made the drawings of *Salvelinus* mouths.

LITERATURE CITED

Anderson, R. M. (1913): Fishes (pp. 450-455). *In* "My Life with the Eskimo" by V. Stéfansson. New York. pp. 538.

Andriashev, L. P. (1939): New data on the ecology and distribution of fish in the Laptev Sea. C. R. Acad. Sci. U. R. R. S. *23*, 7: 730-732.

Backus, R. H. (1951): New and rare records of fishes from Labrador. Copeia *1951*, 4: 288-294.

Berg, L. S. (1931): A review of the lampreys of the northern hemisphere. Ann. Mus. Zool. Acad. Sci. U. R. S. S. *32*, 87-118.

——— (1932): Les poissons des eaux douces de l'U. R. S. S. et des pays limitrophes. Third edition. Vol. I: 1-543. L'Inst. Pêches Pisciculture.

——— (1933): Ibid. Vol. II: 544-899.

Berg, L. S. (1936): Note on *Coregonus* (*Prosopium*) *cylindraceus* (Pallas). Copeia *1936*, 1: 57-58.

Berg, L. S., A. S. Bogdanov, N. I. Kozhin, T. S. Rass (editors) (1949): Promyslovye ryby SSSR. Opisaniya ryb (tekst k atlasa tsvetnykh risunkov ryb). Vsesoyuznyy Nauchno-Issledovatelskiy Institut Morskogo Rybnogo Khozyaystva i Okeanografii (VNIRO). Text: pp. 5-787. Atlas: 230 plates.

Berg, L. S. and A. Popov (1932): A review of the forms of *Myoxocephalus quadricornis* (L.), C. R. Acad. Sci. U. R. S. S. *1932-3*, 6: 152-160.

Dymond, J. R. (1940): Pacific salmon in the Arctic Ocean. Proc. Sixth Pacific Sci. Congr. 1939 (1940) *3*: 435.

——— (1943): The coregonine fishes of northwestern Canada. Contrib. Roy. Ontario Mus. Zool. No. *24*: 171-232 (reprinted from Trans. Roy. Canadian Inst. *24*, 2: 171-231).

Evermann, B. W. and E. L. Goldsborough (1907): A check list of the fresh-water fishes of Canada. Proc. Biol. Soc. Washington *20*, 89-120.

Johansen, F. (1912): The fishes of the Danmark Expedition collected and described. Meddel. om Grønland *45*: 631-675.

——— (Unpublished manuscript in the National Museum of Canada, Ottawa).

Kendall, W. C. (1914): The fishes of New England. The salmon family. Part 1.—The trout or charrs. Mem. Boston Soc. Nat. Hist. *8*, 1: 1-103.

Parr, A. E. (1932): A study of subspecies and racial variations in *Liparis liparis* Linnaeus and *Liparis koefoedi* n. sp., in northern Europe and the European Arctic waters. Bergens Museums Aarbok (1931), 6: 1-54.

Pfaff, J. R. (1937): Fishes. *In* Report of the Fifth Thule Expedition *2*, 7: 1-29.

Preble, E. A. (1908): Fishes of the Athabaska-Mackenzie Region (pp. 502-515). *In* A biological investigation of the Athabaska-Mackenzie Region. U.S. Dept. Agr., Bur. Biol. Surv., North American Fauna no. 27: 574 pp.

Rawson, D. S. (1951): Studies on the fish of Great Slave Lake. J. Fish. Res. Bd. Canada *8*, 4: 207-240.

Schmidt, P. J. and A. P. Andriashev (1935): A Greenland fish in the Okhotsk Sea. Copeia *1935*, 2: 57-60.

Schultz, L. P. and A. D. Welander (1935): A review of the cods of the northeastern Pacific with comparative notes on related species. Copeia *1935*, 3: 127-139.

Scofield, N. B. (1898): *Liparis herschelinus* Scofield—on p. 2123 of—Jordan, D. S. and B. W. Evermann 1896-1900 "Fishes of North and Middle America." Bull. U.S. Nat. Mus. *47*, parts I-IV, pp. 1-3313.

——— (1899): List of fishes obtained in the waters of Arctic Alaska. *In* Jordan, D. S. "The fur seals and fur seal islands of the North Pacific Ocean" Part 3. Rept. Fur-Seal Invest. 1896-97 (fishes, pp. 493-509).

Svetovidov, A. (1936): Graylings, genus *Thymallus Cuvier*, of Europe and Asia. Trav. Inst. Zool, Acad. Sci. U. R. S. S. *3*: 183-301.

Vladykov, V. D. (1933): Biological and oceanographic conditions in Hudson Bay. 9. Fishes from the Hudson Bay region (except the Coregonidae). Contrib. Can. Biol. Fish. N. S. *8*, 2: 13-61.

Walters, V. (doctorate thesis manuscript).

Williamson, H. C. (1908): On the specific characters of the haddock (*Gadus aeglefinus*, Linn.), whiting (*Gadus merlangus*, Linn.); *Gadus poutassou*, Risso; *Gadus argenteus*, Guichenot; *Gadus saida*, Lepechin; *Gadus ogac*, Richardson; *Gadus navaga*, Kölreuter; with a key to the species of *Gadus* found in northern waters. Twenty-sixth Ann. Rept. Fish. Bd. Scotland (1907), part III, No. V: 97-134.

A NEW HADROSAUR FROM THE OLDMAN FORMATION OF ALBERTA: DISCUSSION OF NOMENCLATURE

By C. M. Sternberg

DESCRIPTION

One of the interesting specimens collected by the writer from the Oldman formation in 1936 was a well-preserved skull and partial skeleton of a duck-billed dinosaur. It was preserved in a thin sandstone bed half a mile above the mouth of Little Sandhill Creek, 60 feet above the level of Red Deer River, quarry No. 58 on the Steveville map (19). The skull was partly scattered, but it is virtually complete except the predentary and left prevomer. Several concretion-like masses were present within the skull, and the removal of these caused the loss of some bits of thin bone, but on the whole the skull is remarkably well preserved.

When collecting the specimen, I regarded it as a new species of *Gryposaurus* (8), but further study shows that it is quite distinct from that genus; therefore it is necessary to establish a new genus for its reception. Superficially it suggests *Gryposaurus* or *Kritosaurus* (1), but the broad down-turned upper beak, backward extension of the nasals overriding the frontals and forming a crest, as in *Saurolophus* (2), and the greatly elongated forearm are all fundamental differences. The down-turned beak without any reflection of the anterior edge is suggestive of the Lambeosaurinae (4), as is also the elongated forearm. However, our specimen definitely belongs in the subfamily Hadrosaurinae, for the premaxillæ and nasals are not folded and extended to surround the elongated, looped narial passages, as they are in all members of the Lambeosaurinae (8–p. 68, 9–p. 197). The general shape of the skull and subrectangular beak distinguishes it from *Saurolophus*, though the crest is quite similar (2). The ischium is not known, but it is assumed that it was non-footed.

Family **Hadrosauridae** Cope

Subfamily Hadrosaurinae Lambe

Brachylophosaurus canadensis n. gen. et sp.

Holotype. No. 8893, National Museum of Canada; consists of skull, cervical and anterior dorsal vertebræ and ribs, scapulæ, coracoids, humeri, left ulna, and radius.

Horizon. Oldman formation, Belly River Series, Upper Cretaceous.

Locality. Little Sandhill Creek, NE. 1/4, sec. 6, tp. 21, rge. 11, W. of 4th mer., 60 feet above Red Deer River, Alberta.

Generic and Specific Characters. Skull (side view) high in front, subrectangular, medium breadth; premaxillæ high; beak subrectangular in outline, down-turned in front, not reflected; nasal orifice oval, relatively high, no depressed area for nasal organ; nasal parallel to tooth row,

extending back over the frontals to form a *Saurolophus*-like crest overhanging the parietals; frontals short, mid-portion covered by nasals but outer tip forming part of orbital rim; occipital region narrow, slightly overhanging occipital condyle; paroccipital process of exoccipital heavy and long; maxilla relatively high in front with long anterior maxillary process fitting in groove in premaxilla; lachrymal large, triangular, with tip extending far forward; jugal slender, posterior part narrow and strongly upturned; orbit high; lateral temporal fossa about three times as high as wide; quadrate moderately long and slightly curved; prevomer subtriangular, much longer than high, very thin; dentary moderately high, edentulous portion equal to about half the length of the tooth magazine, upper edge carries forward at about same level as triturating surface then turns down very sharply; enamel face of dentary teeth about three times as high as broad, lingual-buccal diameter greater than fore-and-aft breadth; vertical rows of teeth more numerous in the maxilla (about 49) than in the dentary (about 39); skeleton massive; cervical vertebræ low and broad; anterior dorsals with neural spines of moderate height but great fore-and-aft diameter; forearm very long.

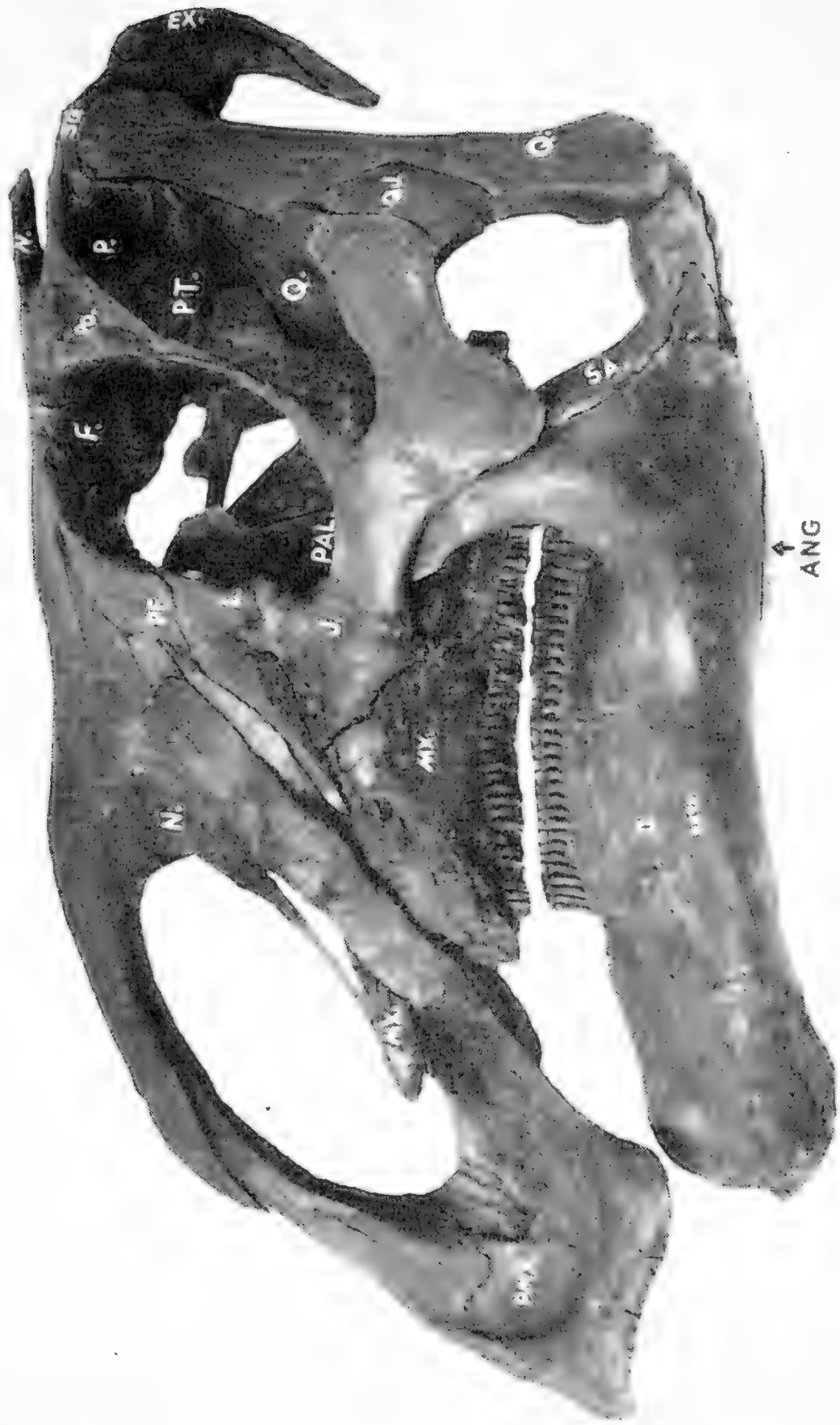
Detailed Description

The greatest length of the head, between perpendiculars, is 800 mm. and the overall height, as mounted (Plate XXXVIII), taken through the orbit is 420 mm.

The *premaxillæ* differs from those of all other flat-headed forms in that the anterior edges are not reflected but are down-turned. In this regard our new species most nearly resembles *Hypacrosaurus*, but here the resemblance to that genus ends (7–pl. 11). There is very little reflection of the edge of the beak in *Saurolophus* and *Prosaurolophus*, but the edge is upturned and the shape of the beak and the general shape of the head are very different (10–pls 22–23). At the base of the upper limb, near the thin inner edge, there is a large bifurcated foramen which extends down through the bone and leads into the mouth. This is well shown in the right premaxilla but is almost closed, by crushing, in the left. The upper limb of the premaxilla stands almost erect, giving a higher nose than in any other hadrosaur. The upper limbs are exposed, from the superior view, for only a short distance behind the anterior tips of the nasals, but they extend between and under the nasals almost to the posterior edge of the naris. Near the base of the lower limb, the inner edge is raised to meet its fellow and between this thin edge and the main part of this limb is a narrow deep groove into which fits the anterior maxillary process (Plate XXXVIII). Due to crushing, the premaxillæ are slightly too low in front.

The nasals are almost parallel to the tooth-row of the maxilla. The anterior tips are over the anterior edge of the naris but are well above the beak. Posteriorly they extend as a broad, flattened, *Saurolophus*-like crest to overlie the frontals, with which they are co-ossified, and overhang the

PLATE XXXVIII



Brachylophosaurus canadensis. Holotype No. 8893. N.M.C. Skull, left side view. X $\frac{1}{5}$. ANG. angular, D. dentary, EX. exoccipital, F. frontal, J. jugal, L. lachrymal, MX. maxilla, N. nasal, P. parietal, PAL. palatine, PF. prefrontal, PMX. premaxilla, PO. postorbital, PT. pterygoid, Q. quadrate, QJ. quadratojugal, SA. surangular, SQ. squamosal. Neg. No. J637.

parietals to their extremities. The crest differs from that of *Saurolophus* in being broader, more uniform in breadth, thinner and shorter, and it does not rise much above the top of the head (2–figs. 1-2). From the centre of the orbit backward it is 100 mm. broad almost to its extremity where it ends in a broadly rounded edge. The greatest thickness of the overhanging part is 18 mm. Total length of nasals 655 mm.

It is difficult to determine the function of this spike-like crest or the one in *Saurolophus* and *Lambeosaurus lambei* (7–pl. 6), but it is quite evident that they all served the same function. It was quite distinct from the hood or crest, of members of the Lambeosaurinae, which encloses the looped narial passages with air traps (17–pl. 1). The much elongated crest of *Parasaurolophus* (12), which superficially resembles that of Saurolophus, is morphologically quite distinct.

The frontal is narrow and short. It is covered by the nasal except for a narrow tongue that extends forward and outward, between the prefrontal and postorbital to form a small part of the orbital rim (Plate XXXVIII, F). It forms a large part of the internal surface of the orbit, but the expansion of the prefrontal has almost excluded it from the rim.

The prefrontal and postorbital are not greatly different from those of *Gryposaurus notabilis*. There is no pocket in the postorbital.

The parietals are short, and the braincase is of moderate breadth.

The squamosal is shorter than in *G. notabilis*, thus giving a narrower lateral temporal fossa.

PLATE XXXIX

Brachylophosaurus canadensis. Holotype No. 8893. N.M.C. Left maxilla and other bones, inner view. X ¼. EPT. ectopterygoid, L. lachrymal, MX. maxilla, PAL. palatine, PT. pterygoid, V. prevomer. Neg. No. J636.

The orbit and lateral temporal fossa are about the same shape and general proportions as in *Prosaurolophus* (10-pl. 22). The lateral temporal fossa is about three times as long as broad.

The occiput is rather narrow, and the exoccipitals overhang the condyle to some extent but not nearly so much as they do in *Edmontosaurus* (9–fig. 5). The exoccipitals are united above the foramen magnum thus excluding the supraoccipital from this position, as in other members of the family.

The maxilla (Plates XXXVIII, XXXIX-MX) is of moderate size, high in front, and the anterior maxillary process is larger than in *Edmontosaurus* (9–fig. 12). This process is securely wedged in the groove in the lower limb of the premaxilla. The tips of the maxillæ are thus separated by the premaxillæ and not by the prevomers.

The lachrymal (Plate XXXVIII-L) is triangular in outline with the anterior point extending far forward and completely separating the jugal and the lower limb of the premaxilla. Its length from the posteroinferior angle to the tip is 150 mm., and its greatest height, in the orbit, is 90 mm. The exposed surface in the orbital rim is 60 mm. The posterior surface is broad and forms part of the anterior rim of the orbit. The lower part of this edge is a thickened circular surface for articulation with the jugal. The lachrymal foramen pierces the thick part of the bone at about midheight.

The jugal resembles that of *Gryposaurus* but is more slender, and the posterior part is more sharply upturned. The lateral temporal fossa is narrower than in *Gryposaurus*. Between the postorbital bar and the raised buttress, for support of the lachrymal, the bone is deeply excavated and the lower anterior angle of the orbit is extended downward and forward but is not so narrow as in *Saurolophus* (2-fig. 1). The thickened anterior part of the jugal, for articulation with the maxilla, is triangular and very rugose internally. Near the back of this area the bone thickens to give a flat circular area for articulation with the broadened lower edge of the lachrymal. Just ahead of this articulation a pointed tip extends up and fits in a groove in the lachrymal similar to that seen in *Parasaurolophus* and identified by Parks as prefrontal (13–pl. 4). Directly below this a somewhat similar tip extends downward for extra support with the maxilla. The greatest height over these two points is 110 mm., whereas the bone below the orbit measures 42 mm. in height, and the total length is 295 mm.

The quadrate is about the same relative length, compared to the length of the skull, as in *Gryposaurus* but much shorter than in *Kritosaurus* (1–pl. 28). It is more curved, posteriorly, than in *G. notabilis* (8–pl. 18). It is 340 mm. long.

The ectopterygoid occupies the same relative position as in *Edmontosaurus* (9-fig. 13) but is relatively longer. It reaches from the back of the maxilla to the jugal contact and has an overall length of 145 mm.

The palatine and pterygoid do not differ greatly from those of *Edmontosaurus*.

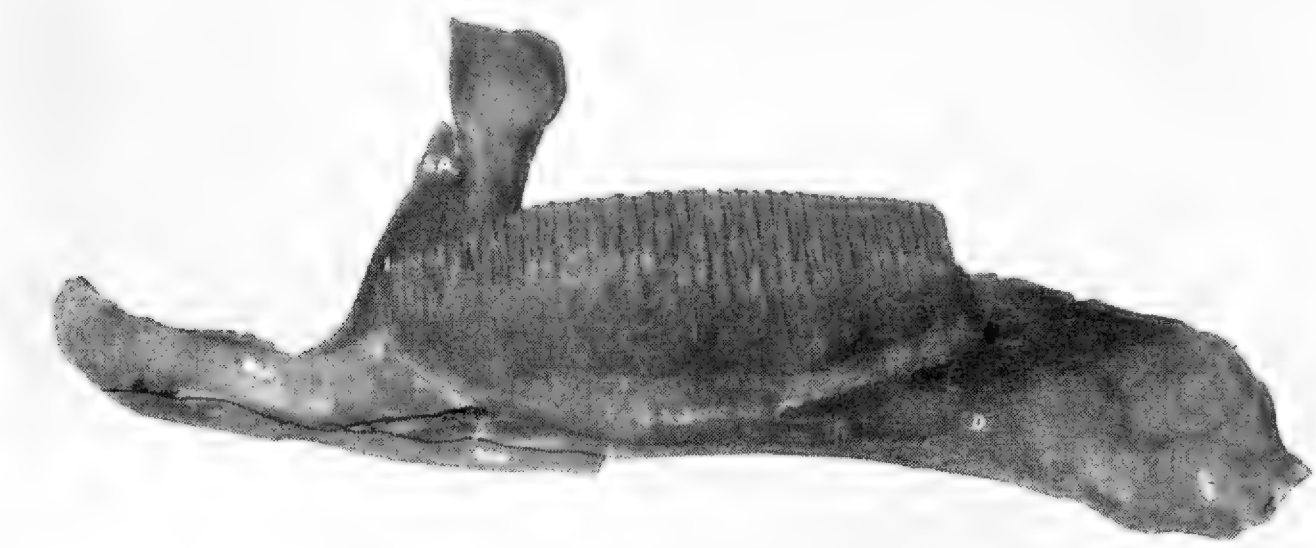
The left prevomer (Plates XXXIX-V) is preserved lying on the inner face of the left maxilla. It is very thin, subtriangular in outline with the anterior part greatly elongated. It is not so high as the prevomer of *Corythosaurus excavatus* (17–fig. 2-PV), but it is very much longer than it. The superoposterior angle is broadly rounded, and the posterior edge extends forward and downward to its lowest point, about three-fourths of the way back from the tip. Here the height is about 90 mm. On the posterior edge, the bone broadens to form a groove which appears to have been for articulation with the front edge of the palatine. At the lowermost angle of the bone are two broadly-rounded, splaying flanges. These flanges are 50 mm. long, and the edges are 30 mm. apart. What these flanges articulated with is not clear. From the greatest height it decreases uniformly to the anterior tip. Near the tip it broadens slightly, and the under surface is striated for articulation with the upper edge of the maxilla, but there is no well-defined groove in the maxilla, as in *Edmontosaurus,* for the reception of the prevomer. At this point the two prevomers may have met on the midline and separated the maxillæ, but they did not extend forward between the anterior maxillary processes nor into the groove in the base of the lower limb of the premaxilla. The total length of the prevomer is 233 mm., and the thickness is less than 5 mm., except as above mentioned.

Lambe (9–p. 37) and Lull and Wright (10–pp. 65-66) discussed the vomer and spoke of it as a single bone. Lambe, though he recognized a line of division suggesting the coalescence of an elemental pair in *Edmontosaurus,* and Lull and Wright all said that in the Cope skull (*Anatosaurus*) the bone seems to terminate on one side of the presphenoid as though it bifurcated and one branch was missing. In our new specimen only one prevomer is preserved, but as this bone is very thin with no sign of coalescence of two elements and as both prevomers are preserved in our skull of *Corythosaurus excavatus* (17–fig. 2, p. 10), it is believed that the prevomers were separate in this genus and probably also in all members of the Hadrosauridae. Both Lambe and Lull and Wright suggest that the "vomer" was a long, splint-like bone, but Lambe saw only the upper edge of the bone in the *Edmontosaurus* skull.

In the skull of *Prosaurolophus* that Lambe examined (9–fig. 38F) there is a long slender point resting in a groove on the inner side of the superior border of the lower limb of the premaxilla. I collected and prepared this skull, and we believed that this tip represented the prevomer. Recently we have done further preparation on this skull and find that this is not prevomer but the elongated anterior maxillary process. In the disarticulated skull of *Edmontosaurus* (paratype) that Lambe studied, the premaxilla was not preserved, but it seems most likely that it was also grooved for the reception of the anterior maxillary process. This process is relatively shorter than in our new species and *Prosaurolophus* but otherwise is similar, and the tips were not separated by the prevomers, as stated by Lambe and Lull and Wright.

The dentary (Plates XXXVIII, XL-D) is of about the same proportions as in *G. notabilis,* but the edentulous portion is higher and the upper edge carries forward almost parallel to the tooth row for a distance of 135 mm. and then turns down very sharply for a distance of 80 mm., or almost to the level of the lower edge of the bone. From here it turns sharply inward and ends in a point. This tip is not preserved with the left dentary, and in the right one it is crushed so that the exact detail cannot be determined. The external face of this broadly rounded anterior end shows a surface for articulation with the predentary throughout its full height. This articulating surface is 100 mm. high and stands almost vertical to the long axis of the skull. Just back of this articulation area are three rather large foramina in a diagonal line. I know of no other hadrosaur with such a blunt anterior end of the dentary.

PLATE XL



Brachylophosaurus canadensis. Holotype No. 8893 NMC. Left lower mandible, inner view, X $\frac{1}{5}$. ANG. angular, ART. articular, D. dentary, PAR. prearticular, SA. surangular. Neg. No. J637$\frac{1}{2}$

The surangular is relatively large and the ascending process, which fits behind the coronoid process, is exceptionally broad and high. This process reaches almost to the top of the coronoid process, and near its tip there is a notch into which fits the lower edge of the expanded part of the coronoid process. In its position behind the coronoid process, and its breadth, it most nearly resembles that of *Saurolophus* (2–fig. 1, b) and *Lambeosaurus lambei* (7–pl. 6).

The articular is a thin, semicircular bone and is wedged in between the posterior tips of the surangular and prearticular. It is so far back that it could have had little contact, if any, with the quadrate. The upper surface is concave. The prearticular and angular do not differ greatly from those of other flat-headed hadrosaurs.

The predentary was not preserved, but it must have had a very high posterior edge with very little overlap of the dentary except the antero-inferior point.

The teeth (Plate XL) are of moderate size and relatively long. In the dentary, the dental magazine is deep and moderately thick. Except at the posterior end of the series, there are usually four teeth in the vertical series below the functional tooth. They are largest near the middle of the magazine, and here they are slightly broader than at the ends, but they are relatively more slender than the dentary teeth of *Gryposaurus* or *Kritosaurus*. On the triturating surface there are usually two stubs of fangs as well as the enamel crown. The lingual-buccal diameter is greater than the breadth of the enamel face. There are 49 vertical rows in the maxilla and 39 in the dentary. There are papillæ on the anterior dentary teeth, but farther back the edges are quite smooth.

PLATE XLI

Brachylophosaurus canadensis. Holotype No. 8893, N.M.C. Left scapula, coracoid, humerus, radius, and ulna. X$\frac{1}{8}$. Neg. No. J638.

The fore limb more nearly resembles that of *Lambeosaurus clavinitialis* (17–pl. 5) than any of the flat-headed forms but is less massive than in *Hypocrosaurus* (4–fig. 6). It is relatively longer than in *L. clavinitialis*. The scapula measures about 820 mm. and is somewhat more slender than Lull and Wright show for *Anatosaurus annectens* (10–fig. 20). The humerus measures 590 mm. The radial crest measures 290 mm., which is relatively shorter than seen in most flat-headed forms. The greatest distinction is in the relative lengthening of the forearm. The radius measures 650 mm.

and the ulna is 725 mm. In *Saurolophus* the radius is 10 mm. longer than the humerus, but in all other flat-headed forms it is shorter than the humerus. The bones of the fore limb are splendidly preserved and uncrushed so the measurements should be dependable. Plate XLI gives a good idea of the shape and proportions of the fore limb. The feet were eroded away before discovery.

NOMENCLATURE AND CLASSIFICATION

In 1914 Brown (5) proposed the subfamily names Trachodontinae and Saurolophinae for the flatheaded and crested duck-billed dinosaurs, at which time he included *Hypacrosaurus* and *Corythosaurus* under the Saurolophinae. Characters for this subfamily were given as "Skull with crest. Ischium terminating in expanded foot-like end." Later studies of the group showed that the crest of *Saurolophus* was formed by the nasals only and was quite distinct from the hood of *Hypacrosaurus* and *Corythosaurus*. In 1923 Parks proposed the subfamily Lambeosaurinae (13), and in 1924 Gilmore divided the Hadrosauridae into Hadrosaurinae, Saurolophinae, and Lambeosaurinae (7). *Prosaurolophus* and *Saurolophus* were placed under the Saurolophinae and all the hooded forms under the Lambeosaurinae.

In the hooded forms the beak is flat in front and never upturned or reflected, as it is in most flat-headed forms. The premaxillae and nasals are greatly extended and folded to surround the elongated narial passages which are looped to form air traps (17). No doubt this was an underwater feeding adaptation. With the pushing back and up of the premaxillæ and nasals, the frontals were greatly shortened, and the head is usually shorter and much higher than in the flat-headed form. The jaws are usually shorter and the number of vertical rows of teeth fewer. This latter character is not dependable, however, because as is well-known, the young animals had fewer teeth. In some dentaries, in the collection of the National Museum of Canada, which appear to represent very young hadrosaurs, there are as few as ten vertical rows in the complete dentary, which is but 80 mm. long. One character which appears to be dependable is that in dentary teeth of the flat-headed forms the enamel face and the fang make an obtuse angle and the lingual-buccal diameter is greater than the fore-and-aft diameter. In the hooded forms the enamel face and the fang are more nearly in alignment, and the lingual-buccal diameter is less than the other (18). In most hooded forms the forearm is elongated, and in all, the distal end of the ischium has a foot-like expansion.

In Brown's type of *Saurolophus* (3) the skeleton was crushed to such an extent that many of the bones were distorted. The ischium was not complete, and the characters assigned to its distal end were taken from the plesiotype. Lull and Wright point out that "The entire pelvis is so much like that of the contemporary *Hypacrosaurus* that one wonders at the possibility of the correct assignment of the plesiotype to this species, for in 1915 *Hypacrosaurus* was unrecognized. This footlike expansion,

other than in this instance, is confined to the Lambeosaurinae and Cheneosaurinae and seems to be correlated with a greater development of the crest than occurs in *Saurolophus*" (10-p. 177). The date "1915" is evidently a typographical error, but what they mean is that *Hypacrosaurus* was unrecognized when Brown assigned the plesiotype to *Saurolophus*. At a later date, Brown (6) described *Prosaurolophus maximus*, which he believed to be ancestral to *Saurolophus*. Still later Parks (14) described a skeleton of *Prosaurolophus maximus*, in which the splendidly preserved ischium showed that the terminal end was not footed.

Although no complete ischium has yet been found associated with a skull of *Saurolophus*, it seems most likely that when such is located it will prove to be non-footed. As the footed ischium is the only fundamental character left which separates *Saurolophus* from the flat-headed forms, and as there is some doubt that the ischium of *Saurolophus* was footed, I would propose that the subfamily name Saurolophinae be abandoned and that *Saurolophus* and *Prosaurolophus* be classified under the Hadrosaurinae. The relative lengthening of the forearm of *Saurolophus* is greater than in most flat-headed forms but is much less than in our new species.

In their very fine monograph on "Hadrosaurian Dinosaurs of North America," Lull and Wright (10) have introduced the generic name *Procheneosaurus* to replace Parks' *Tetragonosaurus*, and I understand that the change was accepted by the Committee on Zoological Nomenclature. It seems to me that this change is a violation of the main rule of the committee. Upon unanimous recommendation by the International Commission on Zoological Nomenclature, the International Zoological Congress which met at Budapest, Hungary, September 4 to 9, 1927, amended article 25 (Law of Priority) to read as follows: "Article 25.—The valid name of a genus or species can be only that name under which it was first designated on the condition: (a) That (prior to January 1, 1931) this name was published and accompanied by an indication or a definition or a description; and (b) that the author has applied the principle of binary nomenclature."

In 1920 Matthew published a popular article, "Canadian Dinosaurs", in Natural History magazine (11) in which he mentioned *Procheneosaurus* as a small duck-billed dinosaur with a little bill and a small round head. We might accept this as "an indication or a definition," but the more important requirement, "the principles of binary nomenclature," was not applied. I wrote to Dr. Matthew and asked him where the description was published, and he replied under date of March 4, 1921, as follows: "Dear Mr. Sternberg: I think *Procheneosaurus* is a nomen nudum. If you come across a description of it please let me know, and oblige, Yours very truly, (sgd.) W. D. Matthew."

In 1931 Parks described *Tetragonosaurus praeceps* gen. et sp. nov. based on a fine skull and partial skeleton, Catalogue No. 3577, Royal Ontario Museum of Palæontology (15). This description meets all requirements, as he applied the principle of binary nomenclature, chose a type for the species, and gave an adequate description with illustrations. He also

described a second species of the genus in the same paper. In view of these facts, I would suggest that the name *Procheneosaurus* should not be used to replace *Tetragonosaurus*.

Though I appreciate and recognize the very fine monograph by Lull and Wright, in one other point I would take exception, i.e., the proposal of the subfamily Cheneosaurinae (10-p. 178). I do not believe that there are sufficient fundamental differences between the various hooded hadrosaurs to justify their separation into subfamilies. The outstanding fundamental distinctions of the Lambeosaurinae are the modifications of the premaxillæ and nasals to surround the elongated narial tubes which are looped to form air traps. The course of this looping varies in the different genera (17). The arrangement in *Tetragonosaurus* is similar to that in *Corythosaurus* but unlike that in *Lambeosaurus*. In *Parasaurolophus* (10-pp. 210-211) the looping is very different again, but in all, the premaxillæ are folded around the extended narial passages. Russell (16) made a careful study of the crest of *Parasaurolophus* and concluded that the greater part of the crest was composed of premaxillæ. He showed conclusively that the frontals did not enter into its formation but was not able to determine, with certainty, what part the nasals played in its development. It may be that in this genus the nasals, as well as the frontals, have been reduced. In *Lambeosaurus* the hood is bent forward, whereas in *Corythosaurus* and *Hypacrosaurus* it is farther back. In *Tetragonosaurus* and *Cheneosaurus* the hood is much lower and farther forward, but this is only a variation, as the same bones are still serving the same function. As far as known in all these, the distal end of the ischium has a foot-like expansion, and in all but *Parasaurolophus* the radius is longer than the humerus. It seems to me that differences between *Parasaurolophus* and *Corythosaurus* are much greater than those between *Cheneosaurus* and *Corythosaurus*.

These differences appear quite sufficient to justify their classification as distinct genera, but it appears best to regard the Canadian Upper Cretaceous hadrosaurs as representing only two subfamilies, i.e., the Hadrosaurinae and the Lambeosaurinae. *Claosaurus* may or may not be referable to one of these subfamilies. Following is a proposed classification of American Upper Cretaceous genera of the Hadrosauridae, with the exception of *Claosaurus* and certain poorly understood forms.

Class Reptilia
Order Ornithischia Seeley
Suborder Ornithopoda Marsh
Family Hadrosauridae Cope
Subfamily Hadrosaurinae Lambe
Genera: *Thespesius Hadrosaurus, Kritosaurus, Saurolophus, Gryposaurus, Prosaurolophus, Edmontosaurus, Anatosaurus, Brachylophosaurus*

Subfamily Lambeosaurinae Parks
Genera: *Trachodon, Hypacrosaurus, Corythosaurus, Cheneosaurus, Parasaurolophus, Lambeosaurus, Tetragonosaurus.*

The fact that in *Parasaurolophus,* which is a hooded form, the radius is shorter than the humerus, and in *Brachylophosaurus,* which is a flat-headed form, the radius is longer than the humerus, shows that the lengthening of the forearm is not absolutely dependable in separating the subfamilies. The number of co-ossified centra in the sacrum and the length of the neural spines may also vary within the subfamily, but in the presence or absence of the folded premaxillæ and nasals, surrounding the elongated, looped narial tubes, rests the decision as to its classification.

REFERENCES

1. Brown, B. The Cretaceous Ojo Alamo beds of New Mexico with description of a new dinosaur Genus Kritosaurus. Bull. Amer. Mus. Nat. Hist. 28: 267-274. 1910.
2. ————A crested dinosaur from the Edmonton Cretaceous. Bull. Amer. Mus. Nat. Hist. 31: 131-136. 1912.
3. ————The skeleton of Saurolophus, a Crested Duck-billed Dinosaur from the Edmonton Cretaceous. Bull. Amer. Mus. Nat. Hist. 32: 387-393. 1913.
4. ————A new trachodont dinosaur, Hypacrosaurus, from the Edmonton Cretaceous of Alberta. Bull. Amer. Mus. Nat. Hist. 32: 395-406. 1913.
5. ————Corythosaurus casuarius, a new crested dinosaur from the Belly River Cretaceous, with provisional classification of the Family Trachodontidae. Bull. Amer. Mus. Nat. Hist. 33: 559-565. 1914.
6. ————A new crested trachodont dinosaur Prosaurolophus maximus. Bull. Amer. Mus. Nat. Hist. 35: 701-708.
7. Gilmore, C. W. Contributions to Canadian Palæontology. Geol. Surv. Canada, Bull. 38, pp. 1-89. 1924.
8. Lambe, L. M. On *Gryposaurus notabilis,* a new genus and species of trachodont dinosaur from the Belly River Formation of Alberta. Ottawa Nat. 27: 146-155.
9. ————The hadrosaur Edmontosaurus from the Upper Cretaceous of Alberta. Geol. Surv. Canada, Memoir 120, pp. 1-79. 1920.
10. Lull, R. S. and N. E. Wright. Hadrosaurian dinosaurs of North America. Geol. Soc. of America, Special Paper No. 40, pp. 1-242. 1942.
11. Matthew, W. D. Canadian dinosaurs. Nat. Hist. 20: 536-544. 1920.
12. Parks, W. A. Parasaurolophus walkeri, a new genus and species of crested trachodont dinosaur. Univ. of Toronto Studies No. 13, pp. 1-32. 1922.
13. ————Corythosaurus intermedius, a new species of trachodont dinosaur. Univ. of Toronto Studies No. 15, pp. 5-9. 1923.
14. ————Notes on a skeleton of Prosaurolophus maximus. Univ. of Toronto Studies, No. 18, pp. 26-35. 1924.
15. ————A new genus and two new species of trachodont dinosaur from the Belly River Formation of Alberta. Univ. of Toronto Studies No. 31, pp. 1-11. 1931.
16. Russell, L. S. The crest of the dinosaur Parasaurolophus. Cont. of the Roy. Ont. Mus. of Pal. No. 11, pp. 1-5. 1946.
17. Sternberg, C. M. Hooded hadrosaurs of the Belly River series of the Upper Cretaceous. Nat. Mus. Canada, Bull. 77, pp. 1-37. 1935.
18. ————The systematic position of Trachodon. Jour. of Pal. 10: 652-655. 1936.
19. ————Notes and annotated list of quarries. Steveville Map No. 969A, Geol. Surv. Canada. 1950.